THE THERAPEUTIC GAZETTE

INCORPORATING

MEDICINE AND THE MEDICAL AGE

Whole Series, Vol. XXXIV. DETROIT, MICH., NOVEMBER 15, 1910. Third Series, Vol. XXVI, No. 11.

ORIGINAL COMMUNICATIONS.

A REVIEW OF THE VARIOUS THERAPEUTIC MEASURES THAT HAVE BEEN SUCCESSFULLY EMPLOYED IN THE DEPARTMENT OF ORTHOPEDIC SURGERY IN THE JEFFERSON MEDICAL COLLEGE HOSPITAL.

BY H. AUGUSTUS WILSON, M.D.,

Professor of Orthopedic Surgery in the Jefferson Medical College of Philadelphia.

FOURTH PAPER: *Congenital Dislocation of the Hip.*

The subject of congenital dislocation of the hip demands attention, notwithstanding its rare occurrence. It has been variously stated that congenital dislocation of the hip occurs once in every thirty thousand to fifty thousand births, and, therefore, the condition is encountered most frequently in metropolitan orthopedic service. Because of the rarity of occurrence it is generally overlooked or errors in diagnosis occur during the early age of the child.

Ordinarily there is very little to direct attention to the dislocation prior to the age of walking, and even after the child begins to walk the bilateral dislocation often fails of recognition because there is no limp, and the condition is ascribed to a deformity of the spine. The characteristic waddling gait of bilateral dislocation is too frequently considered an expression of bow-legs, or other deformity.

The great importance of early recognition cannot be too strongly emphasized because, from the earliest age of walking, the malformations of the joint increase in character, rendering replacement and subsequent function difficult in proportion to the delay. It is essential that it should be clearly understood that in even the very earliest recognizable cases of congenital dislocation of the hip there is not only a displacement, but a material alteration in the contour of the bones that form the joints, and necessarily changes in the fibrous and cartilaginous structures. With increasing use of a joint that is dislocated the alterations in the structure become greater, demonstrating Wolf's law, as it is termed, that prolonged alteration in the function of a joint produces corresponding anatomical changes. The simple disuse of a joint will materially alter the articulating facets, and where the dislocation is congenital, the natural tendency to still further abnormality is an important factor in the consideration of the therapeutics.

Before considering the abnormalities, it is essential that knowledge should be had of a standard, or the conditions that are present in normal hips. In Fig. 1, showing a patient aged four years, the hips are normal and normally placed, with a natural rotundity of the heads of the femurs and the corresponding depth and proper shelf in the acetabula. Inasmuch as the radiograph shows only the osseous structures, it must be assumed that where the bones are in their correct positions the surrounding soft structures of ligaments, capsule, and fibrocartilage are also normal, although not shown in the *x*-ray.

A careful study of the seven *x*-ray plates taken by Dr. W. F. Manges, radiographer to the Jefferson Medical College Hospital,

gives sufficiently accurate details to make clear the importance of early correction, and the impossibility of obtaining late correction. Fig. 2 presents a very good contrast of the abnormal with the normal in a patient aged three years. The head of the

Fig. 1.—Radiogram of patient aged four years. Normal hips.

femur is resting high up on the dorsum of the ilium, is materially altered in shape, and the acetabulum is correspondingly altered, although there is a fairly good shelf, capable of holding the head in position.

Fig. 3 shows a unilateral displacement in a patient aged seven years, again forming a contrast with the normal hip upon the opposite side. On the side on which the dislocation is present, the head is high up on the dorsum of the ilium, and the acetabulum shows even greater changes in the alteration. It will be observed that there is practically no shelf, but the acetabulum presents a saucer-like appearance.

In Fig. 4, in a patient aged nine years, unilateral dislocation again affords a contrast with the normal hip upon the opposite side. With the head high up on the dorsum of the ilium, there are even greater changes here manifested than in radiograms taken of younger patients.

Figs. 5 and 6 are very interesting from the fact that they were taken of patients aged twelve and fifteen years respectively, both of them being unilateral, showing very material anatomical changes. Both of these patients were athletes; one of them played football and was active in general outdoor sports. The other one, aged fifteen, was an expert on the bicycle, his special forte being long-distance rides at high speed. These cases are of decided interest in showing the capabilities of patients to adapt themselves to congenital deficiencies, and in acquiring experience in sports that would ordinarily seem to require normal function of the parts involved.

Fig. 8, patient aged thirty-eight years, may be considered as showing the ultimate results in an uncorrected, unilateral congenital dislocation of the hip. In this patient the original acetabulum still shows fair depth and indicates that the conditions in early life must have been favorable for replacement. Failure to recognize the condition, however, made the patient adapt herself to her deficiencies. She was the mother of several children; her only disability from which she complained was the shortness of the one leg, which had been compensated for in part by the high-sole shoe. These

Fig. 2.—Radiogram of patient aged three years. Unilateral congenital dislocation of the hip. Fairly good acetabulum. Head of femur high on dorsum of the ilium.

last three patients do not fairly illustrate the outcome in all cases of congenital dislocation of the hip, otherwise very much less attention would be given to the early correction. They show, however, what can possibly occur in patients of sound health

and great determination, where the necessities of life demand that they shall employ every faculty to its limit. They do not, and should not, indicate that congenital dislocation of the hip should be allowed to go uncorrected with the hope of future usefulness.

Of the various therapeutic measures that have been recommended for the reposition in congenital dislocation of the hip, the method that is known as the Lorenz bloodless reposition and weight-bearing has been found most satisfactory when applied prior to the age of four or five years. After that time the contraction of the various muscles that participate in the function of the hip in their adaptation to the dislocation has become so permanent as to make their stretching or elongation not only difficult but even accompanied with serious dangers. Nearly all the fractures of the femur or of the pelvis, or injuries to the sciatic nerve, have occurred in patients over six years of age, and then usually where excessive strain was required in order to stretch the soft structures prior to replacement of the head

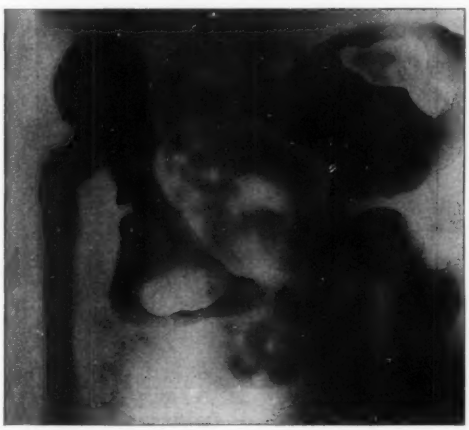

Fig. 3.—Radiogram of patient aged seven years. Unilateral congenital dislocation of the hip. Saucer-like acetabulum. Head of femur high on dorsum of ilium.

in the acetabulum. Even where the soft structures have yielded, the hour-glass contraction of the capsule, together with the altered ligamentum teres, has often afforded an obstacle to complete anatomical replacement that has required considerable force, and has resulted in severe trauma that could have been avoided had the method been employed earlier in the life of the patient. It therefore becomes most important that early recognition of congenital dislocation should prepare the way for early replacement in order to avoid the subsequent malformations, and should be performed at a time when the least possible force will be required to diminish the risks of fractures and other serious injuries.

Fig. 4.—Radiogram of patient aged nine years. Unilateral congenital dislocation of the hip. Saucer-like acetabulum. Very defective head of femur, which is high on dorsum of ilium.

The methods of procedure for correction of congenital dislocation of the hip have been brought to their present perfection during the past twenty years. In 1829 Dupuytren announced his conviction that this condition was not only incurable, but that even palliation was impossible. For nearly sixty years this statement was accepted, and no attempt was made to do more than overcome the shortening by the use of high-soled shoes or the application of some form of brace. In 1887 Buckminster Brown, of Boston, reported a case showing that the luxation might be overcome by the use of long-continued extension in recumbency. William Adams, of London, was at the same time devoting attention to recumbency without extension, with resulting arrest of the progress of the deformity, but without restoration of function. Schede, of Hamburg, long relied upon mechanical support by the application of various forms of

braces. In 1890 Hoffa, then of Wurzburg, and later of Berlin, first directed attention to his cutting operation, and statistics rapidly accumulated showing that this formerly hopeless deformity was curable. Lorenz, of Vienna, became interested and was an advocate of the cutting operation.

Fig. 5.—Radiogram of patient aged twelve years. Unilateral congenital dislocation of the hip. Very shallow acetabulum, which is almost obliterated. Head of femur fairly well developed, but high up on dorsum of ilium.

This he modified by making an anterior incision instead of the posterior incision of Hoffa, thereby avoiding some of the disadvantages of the operation. Lorenz continued to employ the cutting operation until 1892, when, in suitable cases, he abandoned it for the bloodless method of reposition which has since been known as the Lorenz operation of bloodless reduction, retention, and weight-bearing, to distinguish it from his cutting operation. His first paper on the non-cutting method was published in the *Centralblatt für Chirurgie,* No. 33, 1895. Since then the method has been resorted to more or less extensively by orthopedic surgeons all over the world, and has been further developed by its author. It is not too much to say that failure to appreciate the full details of some of the essential features of the more recent modifications made by Lorenz has prevented the accomplishment of the ultimate results that were expected. Lorenz's latest paper upon the subject is a monograph of 260 pages bearing the title of "Die angeborene Hüftverrenkung": verlag von Gustav Fischer in Jena, 1906.

Paci, of Pisa, previous to 1892, tried to reduce a congenital dislocation of the hip in an adult, and by some is referred to as having originated the procedure which Lorenz perfected. Lorenz clearly proved its applicability to suitable cases and established its permanency and freedom from the mortality which followed the Hoffa operation. To Lorenz, therefore, belongs the credit of discerning the limitation of the application of the method to early childhood before gross changes in the joint have occurred, and for the elaboration and perfection of definite details of procedure. He perceived that his bloodless method is not always suitable in the case of patients who have been allowed to walk until the age of seven or eight years, because gross changes

Fig. 6.—Radiogram of patient aged fifteen years. Unilateral congenital dislocation of hip. Acetabulum obliterated. Head of femur deficient, and high on dorsum of ilium.

in the structures composing the joint have by that time become permanent. Those cases of seven or eight years' duration or longer are usually capable of a permanent cure only when recourse is had to the cutting operation; but very much of the severity of that operation would be rendered

unnecessary if the bloodless method were first efficiently practiced.

No preliminary treatment is necessary or desirable except such as may put the child in the best possible physical condition. After all preparations are made and anesthesia induced, the child is placed in the recumbent position upon a strong table of suitable height.

Assuming that the left hip is to be reduced, the assistant stands on the right side of the patient with his left hand upon the pelvis, while the right hand firmly grasps the right thigh (see Fig. 8). He should constantly aim at holding the pelvis in a position to resist the manipulations of the operator, and at the same time to avoid undue tension upon the skin around the genitalia. He should endeavor to keep the pad in place directly under the sacrum, but in such a position as not to impede the movements of the left femur. His position

Fig. 7.—Radiogram of patient aged thirty-eight years. Unilateral congenital dislocation of the hip. Acetabulum shows fairly good depth. The head of femur obliterated and very high on dorsum of ilium. A new acetabulum has formed above the normal one.

is one that requires undivided attention and watchfulness to oppose the movements of the operator as they change in direction and force. The coöperation of a skilful, trained assistant enables the operator to proceed with greater facility, rapidity, and certainty.

The operator stands on the left side of the patient and grasps the left knee in his left hand, placing his right hand upon the pelvis around the acetabulum. The thigh with the knee flexed is flexed on the pelvis until the femur is vertical, when it is

Fig 8.—Beginning stretching contracted muscles. The leg, with flexed knee, is flexed on abdomen, preliminary to right-angled abduction.

steadily and firmly abducted to the full limit permitted by the short and resistant adductor group of muscles, which will stand out conspicuously as the thigh is abducted. While the adductors are under this extreme tension, they are subjected to firm massage with the ulnar side of the left hand, changing to the radial side when necessary (see Fig. 9). Contracture of the muscles of the hand enables the operator to make harder pressure in kneading and hacking. When the adductors are sufficiently stretched or torn so that they cannot be felt when the thigh is strongly abducted, the leg is placed in extension upon the table.

The next to be attacked are the hamstring muscles, which do not appear to be short when the thigh is extended, but which always prevent the knee from remaining extended when the thigh is flexed. In order

to stretch these muscles the knee in full extension is grasped in the left hand with the right hand holding the ankle and the thigh steadily flexed (see Fig. 10). If the tendons do not yield, the thigh should be

Fig. 9.—Thigh in right-angled abduction. Tense adductors being forcibly massaged.

held in flexion and the knee allowed to flex, and then be forcibly extended. This manipulation should be continued with forceful massage over the tense tendons until the thigh with the knee fully extended can be flexed to the extreme point of bringing the foot to touch the patient's ear (see Fig. 11). These manipulations will often overcome the principal muscular resistance, although the tensor vaginæ femoris and other muscles of the anterior group sometimes need stretching (Fig. 12). This is done by placing the patient on the right side or in the prone position and carrying the thigh, with the knee fully extended, into a position of extreme hyperextension. Rotation of the flexed thigh (Fig. 13) stretches any deep pelvi-trochanteric muscles or fibrous bands that have not previously been elongated. The movement can be carried from internal rotation to external rotation as the judgment of the operator dictates.

The patient is again placed recumbent and the trochanteric block placed between the great trochanter and the pelvis and used as a fulcrum. A second assistant may advantageously hold the block in place. The thigh with the knee bent is carried to flexion and then to abduction while the femur is being rotated (see Fig. 14). This forces the head of the bone forward over the lip of the acetabulum and into the socket. The accomplishment of reduction is clearly apparent. The sound of the head jumping into the acetabulum, frequently absent, is not the only evidence of replacement, as the position of the head in its new position can be readily seen beneath the stretched adductor tendons. Further distinct evidence of replacement is afforded by extending the leg, when the head of the femur will escape from the acetabulum and resume its former

Fig. 10.—Stretching the hamstring tendons with knee extended.

position. It can again very readily be reduced to its correct position by the appropriate manipulations. This shows the necessity for the long-continued maintenance of the thigh in the position in which

reduction was accomplished, which is expressively termed the "frog position."

The time required to effect reduction varies with the age and conditions existing in the patient and the skill of the operator. Usually reduction will be effected in from ten to thirty minutes.

When the reduction is completed, it is necessary to fix the leg firmly in the position in which it was reduced. This, as already stated, is known as the "frog position," the thigh being flexed and strongly abducted in right-angle abduction.

Fixation is best accomplished by plaster-of-Paris bandages. No attempt to improve

Fig. 11.—Forcible massage applied to the tense hamstring tendons.

upon the skilfully elaborated technique of Lorenz should or need be made.

A pair of stockinet or wool drawers is placed upon the patient. Inside each drawer leg should be inserted a strip of surgical roller bandage about three feet long. This is allowed to lie loosely inside the cast next to the skin, and is used to give a daily dry rub as a substitute for a bath.

The child is raised and placed upon a convenient form of sacral support with the shoulders resting upon a small bench of sufficient height to correspond with the position of the pelvis. Careful inspection

Fig. 12.—Stretching the tensor vaginæ femoris and anterior muscles and fascia.

will show that the head of the femur is in its proper place. The legs are held fixedly in position by a second assistant during the application of the bandages. Sheet cotton or cotton-batting, such as is used by dressmakers, is applied around the leg and pelvis to a thickness deemed sufficient to protect the patient. This is compressed and made to fit snugly by the use of gauze bandages (Fig. 15). The ends of the surgical roller bandage already referred to are brought together. This is a convenient scratcher that removes itching beneath the cast, and its use adds greatly to the comfort of the patient.

Plaster-of-Paris bandages, as used by Lorenz, are six inches wide and eight yards long. They are made of crinoline, into the meshes of which the best dental plaster has been rubbed by hand. These bandages are immersed in very hot water three at a time. When thoroughly wet, they are squeezed free from the excess of water and passed to the operator and assistant, who rapidly apply a sufficient number to embrace thoroughly the entire pelvis, thigh, and knee. The genitals are completely covered in

order to make the edges strong (Fig. 16). The seemingly unnecessary application of plaster is for the purpose of increasing the durability of the cast. Reverse turns are to be made at the junction of the leg and pelvic portion of the spica in order to increase the thickness of the cast at this point. Ordinarily, from twelve to eighteen bandages are sufficient to produce the desired thickness of about one inch over and around the pelvis and upper thigh.

Fig. 13.—Internal rotation of leg in stretching the deeper pelvi-trochanteric muscles.

As soon as the cast is sufficiently set to prevent breaking or peeling off in layers, a sharp scalpel is used to cut away that part of the cast over the genitalia and anus. The edges around the waist and knee are to be trimmed smooth, the knee-joint being free to functionate (Fig. 17).

The patient is next removed from the sacral support and placed upon a table. The drawers are cut in the groin and folded back over the outside of the cast. The drawer leg is turned up over the cast, while the part above the waist is turned down and fastened to that from below in such a way as to entirely cover the outside of the cast. At a convenient time later the temporary stitching is gone over carefully and neatly. Anesthesia is discontinued when the cast is hard enough to resist any involuntary movement of the child. The patient is placed in bed as soon as the fixed dressing is completed. Pillows should be placed in such positions as will increase the comfort of the patient. Ordinarily from three to six days in bed is sufficient. The only pain experienced is soreness on motion, and this has usually passed away by this time. It is a well-established fact, substantiated in these operations, that torn muscles are not painful when kept quiet.

About the third or fourth day the child, with the aid and encouragement of the nurse, should be taught to extend the knee. At first such movements will be resisted, but gradually the voluntary efforts will be successful and the leg be brought to full extension. About the fifth day the child should be encouraged to get upon her feet and to attempt walking in the rather awkward position produced by the cast. Repeated efforts will be necessary, but in unilateral cases fairly good locomotion will be achieved in the course of a week. Bilateral cases take somewhat longer. When the reduction has been accomplished, the more the patient uses the leg in walking the better will be the ultimate result, because of the action of the head in deepening the acetabulum and becoming more strongly fixed in its new position.

Fig. 14.—Reduction of dislocation after muscles and fascia have been stretched.

Radiograms are here shown to indicate

the gradual changes in the position of the femurs in a case of bilateral dislocation in a child aged two years at the time of the reduction. Fig. 18 is a reproduction of a

Fig. 15.—After reduction, drawers are put upon the patient, cotton-batting covering them, and held in place by a gauze bandage.

radiogram taken two months before reduction.

The first cast should be allowed to remain in position for a period of six months (Fig. 19). Its removal can be easily accomplished by placing the patient in a bath-tub partially filled with warm water. After the plaster has become softened throughout it can be readily cut with a John Ridlon plaster-of-Paris knife. The skin should be washed with soap and water and bathed with alcohol, great care being observed not

Fig. 16.—The completed short spica of plaster of Paris.

to disturb the position of the hip. After the bath the second cast may be applied in the same manner as the first except the position of the leg, which should be brought down toward extension until arrested by slight resistance (Fig. 20). The careful exercise of judgment is required in deciding just how such changes of position should be made, but ordinarily a little less abduction and a little less flexion can safely be secured. An attempt to secure too great a change of position may throw the head out of the acetabulum. Each change of the cast becomes a critical occasion, and it is often fraught with danger, only to be avoided by exercising great care and deliberation.

The second cast is to be allowed to remain in position for one month, when a further change of position with a new cast

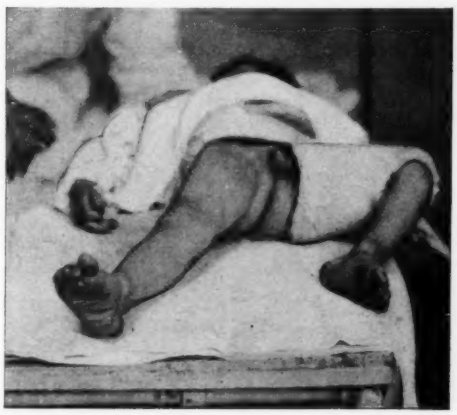

Fig. 17.—The plaster-of-Paris cast has been trimmed so as to uncover the outlets of the body. The outside of the cast is covered with the drawers to hold the cotton-batting in place.

must be made (Fig. 21). The same method of treatment is continued until the leg is fully extended in its normal position. The results can usually be accomplished in about nine months (Fig. 22). With each change of position and cast the activity and freedom of movement of the child are increased.

After the abandonment of the final cast, massage of the legs, thighs, and gluteal region is desirable, preferably done by the operator. The development of the muscles should be encouraged by such forms of exercise and remedial movements as are indicated. During the first week of free-

dom from the restraint of the cast the patient should not be allowed to stand or walk, since the muscles of the hip are incapable of safely sustaining the strain of unguarded movements. This condition soon passes away. The muscles that were torn or stretched at the time of the reduction must be trained to usefulness and coördination in their new relationship.

In cases in which there is excessive resistance, it sometimes becomes necessary to resort to greater force than is indicated in favorable cases, in order to bring the head down to the acetabulum. The danger is present of unduly tearing structures that

Fig. 18.—Radiogram of patient aged two years. Bilateral congenital dislocation of hips. Conditions favorable for reduction.

have already lost the protection afforded by the muscles that must of necessity be torn or stretched. This clearly indicates the need for the exercise of great skill and care in the manipulations. The femur may be broken or an epiphyseal separation take place, necessitating the postponement of manipulations until repair in proper position has been effected, when reduction may again be attempted. Necessarily, it often presents greater difficulties than at first. The ischium may be broken in stretching strongly resistant hamstring muscles. ("Congenital Dislocation of the Hip; Report of a Bloodless Reposition, followed by Death, with an Analysis of Twenty-three Cases in Process of Treatment." *American Medicine*, vol. v, Nos. 20 and 21, pp. 786 and 823, May 16 and 23, 1903.) These accidents, however, are unusual in dexter-

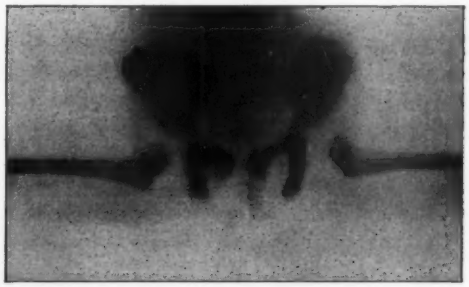

Fig. 19.—Same patient as in Fig. 18, but six months after reduction. Legs in "frog position."

ous hands when young and suitable patients are operated on.

The age suitable for correction ranges from one year to seven years in single dislocations, while in cases of double luxation the age limit is from five to six years. Occasionally, in single dislocations the limit

Fig. 20.—Same patient as in Fig. 18. Seven months after reduction. Legs have been brought down in the progressive stage toward normal extension.

may reach nine years. It is important that the child should be taught cleanly habits before correction takes place. Otherwise constant soiling of the cast will render it unbearable, while constant wetting will make it soft and useless.

Of over one thousand cases Lorenz obtained permanent anatomical cures in sixty per cent of single dislocations, while the percentage of functional cures is, of course, greater. In bilateral cases the percentage of successful operations is lower than in the unilateral form. C. O. Thienhaus (*Lancet-Clinic,* March 10, 1906) claims sixty to eighty per cent of perfect cures when undertaken prior to the age of five years. W. G. Stern (*Medical Record,* Sept. 15, 1906) reports statistics gathered from operators all over the world, which very nearly agree with those first given out by Lorenz as his own experience. The number of hips reported as successfully operated on since 1900 is 2593. Ideal results, restitutiones completæ, 48.98 per cent, anatomical restitutions, 41.76 per cent—1084; excellent functional results, 7.22 per cent—187. Good function from transpositions, 39.98 per cent—1036. Failure, redislocation, bad function, 12.10 per cent—314. The discrepancy between failures and good results (about one per cent) is due to inaccuracy of many of the reports. Individual operators have had far better results. These latter results will and must be attained through careful and painstaking work, combined with increasing experience and advanced methods.

Fig. 21.—Same patient as Fig. 18. Eight months after reduction, the legs having been brought still further down. Feet still everted.

The principal factors that resist restoration and maintenance are alterations in the shape and contour of the bones as well as changes in the fibrous and muscular structures about the joint. The longer a patient has been allowed to walk with these abnormal conditions existing, the greater will be the resulting structural abnormalities. The head of the femur loses its normally round shape and becomes elongated or oblong. The neck also undergoes changes. The acetabulum becomes shallow or obliterated and may be filled with fibrous or cartilaginous material. The capsule is stretched, thickened, and contracted, assuming a condition known as hour-glass contracture. The ligamentum teres is elongated and thickened, and sometimes by its size presents the only obstacle to restoration of the head to the socket. The muscles that are shortened are principally the adductor longus—with the magnus and minimus often as additional factors—the hamstring muscles, and the tensor vaginæ femoris.

Fig. 22.—Same patient as Fig. 18. Final, complete extended position with feet straight. Showing perfect anatomical and functional replacement.

The mortality is *nil* in patients of proper age and in suitable condition for the operation. The very few deaths that have occurred between the ages of one and seven years have been caused by the anesthetic or other conditions that would have produced a fatal result under almost any other procedure, and cannot be taken as indicating that the operation is unduly severe.

TREATMENT OF ENTERIC FEVER.

BY B. N. GHOSH, L.M.S. (CALCUTTA UNIVERSITY),
Lecturer on Materia Medica and Therapeutics, Calcutta Medical School and College of Physicians and Surgeons of Bengal.

The consideration of the treatment of enteric fever is the most important and practical part of the subject. It is here that the practical skill and sagacity of the physician are mostly taxed. He will have to encounter many hidden rocks and shoals, necessitating careful handling and steering. Firmness of purpose and steady perseverance will be the guiding principle, but he must be careful not to hold the helm with too tight a hand. Often he will have to pour balm on the irritable feelings of the patient in this as also in other conditions, who may think he is paying dearly for the relief of his disease. When we find Charles Lamb writing in one of his letters to Wordsworth, "What have I gained by health? Intolerable dulness. What by early hours and moderate meals? A total blank," shall we be surprised when those who consult us are not as tractable as could be desired?

In the treatment of this disease the physician should be impressed from the beginning with the fact that careful nursing is of the utmost value, and medicinal agents of secondary importance. This is an obstacle which one has to struggle against in a private case, where trained nurses or attendants to watch the patients are found only in exceptional circumstances. Still we have to treat our patients. In a well-regulated hospital the physician has very little to trouble him in the general management of the patient as regards his hygienic condition, but in a private family he has got to look on this side also.

Hydrotherapy.—This was known to our ancient sages, and regular bathing of the body and keeping the skin in a healthy condition were held in high esteem. Besides cold bathing was recommended to be used in some inflammatory fevers and in madness. But the credit of having established the treatment of fevers by bathing belongs to James Currie, of Liverpool, who started this treatment from the time he saw how Dr. William Wright, afterward president of the College of Physicians, Edinburgh, when suffering from fever on board ship, went on deck and had three bucketfuls of cold water thrown on him to his immediate relief.

The chief application of the bath is in cases of typhoid fever, and it was in this disease that the cold baths were most energetically used. But the elaborate process in cold-bath treatment can hardly be carried out in a private family, and in desperate cases in which cold applications to the head have not been able to bring down the temperature we should adopt some other means, as by itself it is injurious. Cold sponging is very good and ordinarily serves our purpose excellently well. But cold bathing as a routine treatment can be carried out only in a hospital. The general rule should be to give a cold or tepid sponging whenever the temperature keeps up to 104° F., especially in the second stage of fever, with but slight morning remission.

Whatever might be the advantages claimed for the cold bath, I must confess I am skeptical in adopting this plan as a routine treatment. During the latter period of the attack it is seldom wise to put a person into a cold bath. Further, one can easily see the danger attended with lifting the patient several times, and nervous and sensitive patients not infrequently are collapsed. A cold or tepid sponging, if judiciously carried out, with a little toilet vinegar or eau de Cologne, will accomplish the desired effect at a less risk; besides, cold sponging, in addition to reducing temperature, has the advantage of exercising a sedative influence on the nervous system.

Medicinal Treatment.—The influence of the specific bacillus in setting up the changes leading to such consequences often makes us think that intestinal disinfection is more needed to counteract some of the

effects, therefore almost all the known antiseptics have been tried in the treatment of this disease.

I will here describe the treatment which I have tried in a number of cases with encouraging results, and although I do not claim the credit of having introduced it for the first time in practice, I can vouch from the observations made for the superiority of this plan over others.

Of the many drugs that were used I selected *hydrochloric acid* and essential *oil of cinnamon.* This combination has a beautiful effect on enteric fever, and whenever the patient was put on this early enough, the foul, thickly coated tongue never appeared. A distinct shortening of the course of the fever was noticed, and other things being taken into consideration physical strength was admirably maintained. My plan is to begin with 10 minims of the dilute acid and 2 minims of the oil for a dose, made up into an emulsion with syrup of acacia and eucalyptus water, and this is given every three hours. The hydrochloric acid is of great value, and I gradually increase the dose to 20 minims of the acid and 5 minims of the oil.

Mouth, tongue, and throat are affected by the acid, and there is an increased salivary secretion, and being the natural acid of the gastric juice, it greatly helps digestion and supplies the element which is materially deficient. Further, it is an antiseptic, and an acid condition of the intestinal contents is of great value, being hostile to bacterial life. Cinnamon oil no doubt helps in the action of the acid; with it patients remain more or less drowsy, as a result of which mental rest is secured, consequently delirium is less frequent; intestinal decomposition, as evidenced by abdominal pain, distention, and fetor of stools, is controlled to an extent which is very striking. Besides, cinnamon oil has an inhibitory influence on the bacteria in a dilution of 1 in 2600, and when its strength approaches 1 in 1000 its antiseptic effect is complete.

From the results obtained I am led to think that we have in these drugs a valuable means in combating enteric fever. Although I am aware of the objections that may be raised against the method, I am still inclined to the opinion that this combination has got some specific action on the intestinal lesions of this disease. But in order to have the best results, the patient should be placed under the treatment as early as possible, with strict observance of diet and other conditions.

Antipyretic Treatment. — Contradictory views are held by authorities as to the means of reducing temperature by antipyretic treatment, which include hydropathy and antipyretic drugs. Reduction of temperature by the use of the antipyretic group is mentioned here only to condemn it. The increasingly thorough investigation into the pathology of fever and our increased knowledge of the life history of the organism causing the disease have made it clear that fever is a comparatively unimportant factor unless excessive. Every one should agree that a high febrile temperature requires active interference, but the method of doing it is by no means unimportant, abstraction of heat without diminishing the production being the safest and best way. For some years, from the highest to the lowest, the fad was to regard fever as a most deleterious factor and to treat it as if it were a part of the disease or the disease itself, instead of a symptom of all infections, and the discovery that the antipyretic group of drugs decreased heat production and increased heat dissipation seemed to fit them peculiarly to meet the demand of the hour. But it is one thing to reduce pyrexia and another thing to treat fever.

Therefore these drugs should not be used to reduce temperature except in cases of sudden emergency or unless it is dangerously high, for (*a*) the outlook of fever is not improved by this means; (*b*) fever is an attempt on the part of the body to protect itself against infection; (*c*) these drugs are poisonous and depress the heart considerably, and possibly when they were in vogue many deaths were due to their use. We should therefore depend upon

cold sponging and cold applications to the head.

Administration of Stimulants. — The question of giving stimulants in the shape of alcohol is one of vital importance in cases of enteric fever. At the beginning, when the disease was first clearly recognized, the fad was to give alcohol from the very onset. But ordinary uncomplicated cases do well without any stimulants—in fact, patients requiring stimulants from the commencement will be beyond medicinal agents later. Much discretion is therefore necessary in giving alcohol to our patients. Sometimes alcohol becomes necessary, however, not only to maintain circulation in an efficient condition, but also to produce sleep. Further, in this disease tissue metabolism is great, and alcohol acts as a food; large quantities are tolerated during fever without any symptoms of intoxication. Alcohol may again be used with advantage in cases of old persons, those who take nourishment badly, and those who are victims of a persistent feeling of depression. Experience alone will guide one when and where to use wine. The indications are:

(*a*) To strengthen and reduce the frequency of soft and quick pulse.

(*b*) To diminish frequency of respiration in pulmonary congestion and pneumonia.

(*c*) To moisten a dry, brown tongue.

(*d*) To lessen delirium and produce sleep when associated with muscular tremor and feeble circulation.

(*e*) To aid digestion.

(*f*) To sustain the heart and the nervous system.

(*g*) To reduce temperature.

If it is found that alcohol fulfils these objects, it is doing good; if it does not, its use must be suspended.

One of the most beneficial effects of alcohol in this disease is its hypnotic effect, and in this way it often leads to great improvement, where want of sleep, tremor, and delirium are evidences of commencing failure of the nervous system.

For all these purposes brandy is used, and experience has shown that old brandy is more efficacious than newer spirits. It is best given with milk and other nourishment, but often patients who are not used to it object, and refuse to take the diet also. Give it with plain water or in the form of a mixture with other diffusible stimulants.

Particular care should be taken, especially in the tropical countries, in the administration of stimulants to patients in the small hours of the morning. The cold of the small hours, so beneficial to the healthy, has an influence over the sick to be dreaded extremely. It is at this most critical period of the twenty-four hours that patients become suddenly collapsed. The sequence of depressing causes which increase this tendency to death is clear, namely, exhausting and painful disease, eighteen hours of exhausting heat and absolute sleeplessness, neglect of tired attendants or nurses in the administration of nourishment, and finally a sudden and considerable fall in the temperature of the air.

In complicated cases a choice must be made of the form of alcohol to be given. In cases of persistent vomiting, champagne may be selected, and if diarrhea is present a good old port may be tried.

Persistent High Temperature.—There is a group of cases in which a moderately high and sustained temperature persists for many days. It is in these cases that the use of antipyretics is mostly resorted to by physicians. In hyperpyrexia all physicians agree that there is only one course left for us—that is, the use of cold sponging and cold applications to the head. It is in some of these cases that a physician is often tempted to use drugs like phenacetine or antipyrin, etc. My plan is to add quinine to the hydrochloric acid and cinnamon mixture, and I have found, much to my delight, that the temperature comes down within twenty-four hours. Marked remissions are noticed in the temperature, and the curve is no more of the high continued type. I give it in small doses, about 2 grains every three hours. There can be no doubt as to the good effects of quinine under these circumstances, but quinine as a routine treatment is not recommended. It possesses, how-

ever, marked antiseptic influence over living cultures of typhoid bacillus, and its administration is not attended with depressant influence on the heart. Moreover, it is believed not to exert any inhibitory influence on the elimination of toxins from the system. It also acts as a poison to malarial parasites, and not infrequently we find a touch of malaria in most of our tropical patients. Creosote or camphor ℥j with lanolin ℥j, rubbed over the pit of the stomach, will often reduce a high temperature without any untoward effects.

Diarrhea.—Looseness of the bowels is a constant feature in typhoid cases. But in every case of diarrhea the stools should be carefully examined, and if there be any curds present the patient should always be placed on *whey*. Often this change of diet will stop diarrhea, and if we have early placed our patient on hydrochloric acid and cinnamon mixture, rarely will this appear after the diet is changed. A careful inspection of the stools supplies the key for regulating the diet and the treatment of diarrhea. But if diarrhea continues notwithstanding and is attended with flatulence, we must know that this is the effect of ulceration and catarrhal processes set up in the small intestine, and the best indication for treatment is to try to arrest peristalsis of the intestines as far as possible. Thistle's method of purging with a view to clearing out toxic matter via the intestines should never be resorted to. In fact, diarrhea should never be allowed to continue if the number of motions exceeds four to five a day.

In milder cases, bismuth subnitrate, or salicylate, about 15 to 20 grains twice or thrice a day, is sufficient to stop it. If it still persists, we have to use opium in some form, which is by far the best drug, as it serves a double purpose—it subdues diarrhea by lessening peristalsis and checks wakefulness and delirium to a great extent. Dover's powder may be used, alone or with bismuth.

Excessive tympanites is a bad symptom, for it often interferes with respiration. Increasing the dose of oil of cinnamon will, in most cases, cause it to subside. Turpentine stupes will often relieve it. In very bad cases we will have to give either a turpentine enema or pass a rectal tube. Retention of urine will often give rise to tympanitic distention; in such cases the bladder should be relieved.

Constipation.—The condition which we are far more frequently called upon to treat than diarrhea is its converse, constipation, and this often becomes very troublesome, and is especially so with children. In the first stage of the disease a purgative, preferably calomel, may be used, but when there is excessive ulceration with consequent inflammation it is not sound to use a purgative. Remember Hilton's law, "Rest for the inflamed organs." A drachm of glycerin as an enema or a glycerin suppository should be given to open the bowels. But often they fail to act, and the plain glycerin is expelled. In such cases I always administer very small doses of calomel followed by a glycerin enema. Castor oil is advised by some authorities.

Hemorrhage is a very serious complication and always calls for immediate arrest. As I observed, this often takes place at the time when sloughs are separating from the ulcers in the third week. Importance of absolute rest, alike of body, mind, and bowel, is acknowledged on all sides. Everything calculated to stimulate the circulation should, for the time, be studiously avoided and the amount of nourishment reduced to the lowest possible point consistent with maintenance of the physical powers. The patient should be placed entirely on whey, preferably alum whey, which should be iced.

Great care should be taken with regard to the management of the patient at this time. He should be disturbed as little as possible. The use of bedpans and napkins for a few days will save many lives. The head of the bed may be lowered and an ice-bag placed over the right iliac region. The bag should not rest on the abdomen, but should be hung down just to touch it, so that the weight is not felt. As a preventive, much can be done by giving cal-

cium salts in cases of persistent diarrhea, for these cases, as I have observed, often terminate in hemorrhage. Besides, there is much wisdom in ascertaining the coagulability of blood under such circumstances.

The medicinal treatment of hemorrhage depends on:

(*a*) Suitable administration of hemostatics.

(*b*) Arrest of intestinal movements.

(*c*) Increase of coagulability of blood.

Here again opium stands on a high level, and *lead and opium* pills are often used with great advantage. By it intestinal peristalsis is controlled, pain relieved, and hemostasis results. Aromatic sulphuric acid 10 minims, tincture of opium 10 minims, and tincture of hamamelis 30 minims, made up into a mixture with chloroform water, is always used with good results. Turpentine has a great reputation as a hemostatic; but in order to secure its full benefit it should be used in 15-minim doses. Some physicians use it as a routine treatment in all typhoid fever cases.

The value of turpentine as a hemostatic is no doubt very great, but doubts are entertained as to its value in the routine treatment of all cases of enteric fever, as the drug is so often apt to cause inflammation of the kidneys. Adrenalin chloride solution in frequent doses may be given when the pulse tension is particularly low. The third indication of treatment in cases of hemorrhage is met by calcium salts; this should always be used in cases of hemorrhage to increase coagulability of the blood. In the form of liquor calcis saccharatus large quantities of calcium may be given to our patients, and this preparation will often be found very advantageous, as it is a food and medicine at the same time. Calcium chloride in 10-grain doses deserves a trial.

When the hemorrhage has stopped for over twenty-four hours, and if the patient be very low, stimulants may be given, just enough to keep up the patient's strength.

Perforation.—As mentioned before, this is a terrible complication, and when it occurs the only chance of life left to the patient is immediate laparotomy. This can only be performed if the patient be in hospital. Opium should always be given in full doses to lessen the effects of shock and relieve suffering.

Retention of urine often gives great trouble. Urotropin in 5-grain doses should be given twice a day; this is often sufficient to keep the bladder acting, but especially with children it often fails, and in such cases tapping the lower abdomen, over the region of the bladder, with the finger to mechanically stimulate its action will be found very useful. If not then relieved, a catheter must be passed.

Insomnia and Delirium.—It should be noted that these often accompany hyperpyrexia or sustained high temperature. Our first aim would therefore be to try to reduce the temperature, and if this fails to induce sleep and lessen delirium, then we will have to give some cerebral sedatives. Hyoscine hydrobromide 1/200 to 1/100 grain is by far the best drug to use. Paraldehyde (1 drachm) may also be used without producing any ill effects. Sulphonal, trional, or bromides are also recommended by some authorities. A stiff dose of brandy or whisky will often induce sleep. Retention of urine and rectal discomfort, the result of insufficient action of the bowels, are sometimes responsible for sleeplessness.

Besides these, one of the most serious conditions affecting the safety of the patient is cardiac failure. Weakness of the heart's action is indicated by the pulse, and is due to changes in the myocardium or to general prostration. We should, therefore, always watch the pulse from the very onset, and exhibit cardiac stimulants as soon as there is the slightest indication for it, as evidenced by the undue rapidity either in the force or rhythm. Of the drugs used to stimulate the heart, strychnine yet maintains its high position, and is perhaps the best drug to use. In the form of liquor it can be given with the hydrochloric acid mixture with advantage. In urgent cases it must be subcutaneously injected—in fact, it is the only sheet-anchor to tide over the difficulty in cases of sudden emergency.

Hoffmann's anodyne with spiritus ammoniæ aromaticus, tincture of musk, and brandy may be used as diffusible stimulants. This combination will often be found to improve the low muttering delirium which so often complicates these cases. To reduce the frequency of the pulse digitalis is often used, but doubts are entertained of its value in reducing the pulse-rate when temperature is very high.

In some cases the feebleness of the pulse is associated with marked ventricular dilatation, in which case pulmonary congestion is very prone to arise. The good effect of digitalis under these circumstances is clear, and may with advantage be combined with strychnine.

Ordinary bronchial trouble requires no special treatment, except that the patient should have a flannel banian and a stimulating liniment for local application over the chest. When, however, there is bronchopneumonia or pneumonia present, special methods of treatment are required.

THE EFFECTS OF HASCHISCH NOT DUE TO CANNABIS INDICA.

BY M. V. BALL, M.D., WARREN, PA.

Having been asked the question if the use of cannabis indica was liable to cause a drug habit, as we ordinarily apply the term to opium and alcohol, I was led to make a search through the very curious and elaborate literature on this subject, and though it may be presumptive on my part to write anything about a drug with which I have had little experience, yet I believe I can establish some points that are not generally known, and which to my mind explain why such varying opinions have been held about the effects of this substance.

There is no record to my knowledge of any habitués of cannabis indica among the Anglo-Saxons. A rather extensive search of the literature fails to show any such cases. On the other hand we find volumes written about the haschisch eaters of Persia, Arabia, India, and Egypt. Two commissions were appointed by the government of India to investigate the so-called evil of the hemp drug habit, the last one in 1893-94, and its report, consisting of seven large volumes, makes interesting reading.[1]

In 1790 the English government placed a tax upon the sale of hemp drug intoxicants. In Egypt, Turkey, and Greece laws have been passed prohibiting the use of hemp drugs. In general literature we find numerous references to the people who fortified themselves with haschisch before going into battle, and who were called assassins, presumably because of their use of haschisch. The word assassin is probably derived from "Hassa," to kill or exterminate, or from "Hassan," who was chief of a sect, or from "Sachs," king of kings! In Hindoo literature preparations of the drug have been extolled as the drink of heroes. In the folk songs "Ganja" or "Bhang" is invariably the drink used before performing any great feat. It was connected with religious festivals and the worship of ancient gods.

Burton[2] in his "Anatomy of Melancholy" mentions Bange alongside of "Datura" as a remedy to drive away melancholy, and he quotes Garcius Ab Horto as saying, "If Datura is eaten, all sense of grief is taken away for twenty-four hours, and one is inclined to laughter and mirth. Bange is like in its effects to opium, causing a kind of ecstasy, an inclination gently to laugh."[2] But when a closer examination is made of the Indian preparations and the methods of their employment, we find that in the East cannabis indica is never used alone but always in a mixture; that it is used like tobacco in our country, smoked in pipes or cigarettes, under the name of "Ganja" or "Charus," and as an elaborated product mixed with numerous spices, seeds, and other drugs; that when used internally it is drunk under the name "Bhang," which is a drink variously prepared and somewhat like our cider—when allowed to ferment it acquires alcoholic properties; that it is also used in the form of a confection known as

"Madjoun," which contains, among other things, opium, cantharides, and stramonium; that the ordinary medicinal extract of cannabis indica, as we in the West obtain it, is never employed internally as an intoxicant.

Various effects are ascribed to the plant when grown in different localities, whether male or female, wild or cultivated, but these differences appear to be unimportant. It seems to me that all the symptoms ascribed to the use of cannabis indica are to be explained by the admixtures which are ordinarily contained in the hemp preparations as they appear in the Ganja shops and haschisch joints of the Oriental countries. The descriptions of delirium and fantastic dreams as given by some romantic writers are of the same nature as found after the use of hyoscyamus and opium. Hyoscyamus, datura, and opium have long been used as stimulants and intoxicants by the Orientals. Whenever Bhang or Ganja is mentioned in the old literature it is usually in association with opium. In an Indian epic poem of Alhá and Rudál, heroes who lived in the twelfth century A. D., there are numerous references to Ganja, and also to the great amount of opium in connection with the Ganja given to each warrior.[3] DeCourtive states that the Persian Ishmaelites composed "Haschischa," a mixture of drugs with honey and mandragora. He also quotes Koempfer as saying, "Haschisch is composed of datura and opium;" also Merat and DeLens (Dict. de Mat. Med., 1834) as saying, "In India one mixes the leaves of hemp with opium, sugar, and arec."[4] Moreau in his work states: "The Arabs mix with the hemp to make an electuary, cantharides, canella, and other aphrodisiac substances, opium and other narcotics."[5] O'Shaughnessy, who was one of the first to call the attention of modern Europe to the medicinal virtues of cannabis, says: "The large leaves and capsules are used for making an intoxicating drink, and the dried hemp plant is sold for smoking chiefly." He quotes "Rumphius" as stating (Vol. V, Herbarium, 1695, Amsterdam) that exciting effects occurred from the mixture of the hemp leaf with spices, camphor, and opium; and also Ness V. Esenbeck et Ebermaier as saying: "Hemp is used in the East in combination with opium in preparations of intoxicating potions." He ends his work by saying, "As for the evil sequelæ so unanimously dwelt upon, these do not appear to me so numerous, immediate, or formidable as many which may be clearly traced to overindulgence in other powerful stimulants and narcotics, viz., alcohol, tobacco, and opium."[6] Beaumont-Small in his article in the Reference Handbook of Medical Sciences states: "In Arabia cannabis is combined with opium and other narcotics to form haschisch."[7] DeCourtive, mentioned above, states that the Malays combine it with their opium or maleck, and that the "madjoun" of Algeria and the "dawamesc" of Arabia are complex products containing nux vomica and other poisons.

It is also interesting in this connection to note that the "dawamesc" spoken of by Moreau as the common product of Arabia is a name applied to a famous mixture of drugs by an Arabian physician (Mesue) who lived about 800 A. D. "Diamoschos" is a name that frequently appears in Arabian prescriptions and is used as a term for confections or pastes. According to Lapin, "Bhang" is a Sanscrit and Persian word meaning to intoxicate, and haschisch is a general name for intoxicating preparations containing, besides hemp, sweet fruits, nuts, spices, sugar, honey, opium, tobacco, ale, wine, cantharides, stramonium, and other things. Joy pills called "Gandshakini" are made of powdered cannabis weed mixed with opium, camphor, and musk.[8] Fraenkel states that among the Europeans no eroticism is noted, and also that in the rich literature of haschisch not one fatal case of poisoning has been reported.[9] Lauder Brunton is quoted by the Indian Commission as saying in his Text-book of Pharmacy: "The trials made with cannabis in England seem to show that it does not have any aphrodisiac action, but the Easterns give the mental disturbance a sexual direction by mixing it with musk, ambergris, and cantharides."[10]

In the thorough investigation made by

the Hemp Drugs Commission in India in 1893, they noted that the hemp drugs were used in two ways—as a drink called "Bhang," which is used by all classes of people and on various festal occasions, which has a tonic action and which is made differently in different provinces, one formula consisting of rosebuds, poppy seeds, almonds, cardamom, saffron, musk, nutmeg, milk, and sugar. Unless this is allowed to ferment it seldom causes any untoward effects and is used as a cooling drink. "Ganja" is smoked in a special way and has mixed with it tobacco for the most part, and often opium and stramonium. There is a sour-smelling drink which is obtained by fermenting the plant, and which is sold in the shops alongside of "Ganja," known as "Boja." Licenses for the sale of Ganja are required, and the same person usually sells opium. The Commission found on investigation that as alcohol was raised in price the poorer classes took to other intoxicating drinks; that the alleged cases of insanity due to Ganja smoking were for the most part not clearly proven; that those who indulged in crime were not driven to it by the excessive use of this drug, but when excesses were noted they were usually connected with other vices, such as alcohol and opium; and that Ganja always appears in the shops as a prepared product. Not a single medical witness could clearly prove that the habit gave rise to mental aberration.

There is no modern literature on the subject, and the statistics of the asylums, which have been quoted over and over again, on investigation were found to be entirely untrustworthy. At present there is no way of knowing how far the injury caused to the consumer is due to the pure drug itself and how far to the other poisonous substances mixed with it. Experiments made on animals show that the inhalation of hemp alone fails to produce any morbid effects on the brain, but that the inhalation of datura causes serious changes. According to the reports made to the Commission, the product from the hills, which is considered much more active, is often adulterated with hyoscyamus.

The tax on hemp drugs in India was originally established to produce a revenue, and was placed on other drugs, like opium. The Commission also found that the statements of native doctors claiming that the use of hemp caused insanity and other diseases were not founded on scientific fact, but were largely traditional and influenced by the religious feelings of a people who held in abhorrence alcohol and tobacco in any form. For these reasons Turkey passed its laws prohibiting the use of hemp intoxicants. The Commission came to the conclusion that the suppression of Bhang as a drink is unjustifiable; that its use is ancient, has religious sanction, enters into a social custom, and is almost without exception harmless, even beneficial; that the smoking of ganja and charus is as a rule done in moderation, but that the excessive use has sometimes dangerous effects, not, however, such as to call for its prohibition. Even excessive users are rarely offensive, and the evil results of the drug are so small that very few witnesses have any actual personal knowledge of them. The cases seen in the public shops are of excessive smokers who have been very inadequately observed. There is no evidence of any weight regarding mental or moral injury from moderate use of the drugs.[11]

Crothers in speaking of haschisch states: "It is well known that opium is nearly always associated with hemp. The presence of the insane impulse called 'running amuck' has been traced to the use of hemp and opium. Manias and delirium coming on suddenly are often found to arise from the use of opium."[12] Kane gives a whole chapter to the haschisch habit, but knew personally only one habitué, and he states: "She was the wife of an English army surgeon, and occasionally added a little opium to the hemp and smoked it and inhaled the smoke. She was of an intensely nervous temperament and was formerly addicted to the excessive use of alcoholic stimulants."[13]

The fact that Indian preparations of hemp and haschisch contain opium is not generally recognized is evident from a reply received May 14, 1910, in answer to a question of mine, from Dr. H. C. Wood,

Jr., chairman of the Committee on Drug Habits of the American Medical Association. He states: "I do not know whether the habit has ever been reported among the Anglo-Saxons. Haschisch is a resinous matter and is obtained directly from the hemp plant, and therefore does not contain opium. I have never heard of opium being added as an adulterant." Merck & Company in a letter dated June 14, 1910, state: "Haschisch, so far as we know, is an extract of the Indian hemp plant prepared in a special manner. We regret we have no information regarding the preparation other than that afforded by the various Dispensatories." M. I. Wilbert, of the Council of Pharmacy and Chemistry of the American Medical Association, states: "So far as I know there are no authentic drug addictions on record among the Anglo-Saxons, and I am rather inclined to think that the agitation of the last three or four years to include cannabis indica in the list of habit-forming drugs is unwarrantable, and there is very little in the literature that will throw any light on the supposed use of cannabis indica in this or in European countries." H. A. Hare states: "In the Anglo-Saxon cannabis indica habit is practically unknown, but in the East Indies when used to excess the drug sometimes causes maniacal insanity, from which the patient nearly always recovers. It is a sexual stimulant in small doses."[14]

Sollman in his work on Pharmacology classes cannabis with drugs similar in action to morphine, and speaks of the effect among the Orientals as "causing them to be transported into an Elysium," but with the Caucasians the stimulating effect is smaller, the aphrodisiac effect wanting, and intoxication often absent. He considers haschisch, bhang, ganja, as synonymous with hemp.[15]

From this evidence it is clear that the deliriums, manias, dreams, and sexual excitations noted from time immemorial as accompanying the use of haschisch preparations, and which have seldom if ever been observed with the pure medicinal preparations, are clearly due to the stronger drugs with which the mixtures in common use throughout the East are associated; that the acute manias, if traceable at all to ganja or haschisch, are in all probability due to the inhalation of hyoscyamus and opium contained in the preparations. There is no proof whatever that cannabis indica extract by itself, taken internally or even smoked, causes a habit, and to continue to list it with such habit-forming drugs as morphine, chloral, and alcohol greatly detracts from whatever value it might possess as a sedative.

Note.—Formula for Bhang as used in Mysore, India:

Ganja, 220 grains.
Poppy seed, 120 grains.
Pepper, 120 grains.
Ginger, 40 grains.
Caraway seed, 10 grains.
Cloves, 10 grains.
Cardamom, 10 grains.
Cinnamon, 10 grains.
Cucumber seed, 120 grains.
Almonds, 120 grains.
Nutmeg, 10 grains.
Rosebuds, 60 grains.
Sugar, 4 ounces.
Milk, good, 20 ounces.

Boiled together.

REFERENCES IN TEXT.

1. Report of the Indian Hemp Drugs Commission, Simla, 1893-94.
2. Burton's Anatomy of Melancholy, 1652. Eighth, 1860, Edition, p. 390, *et seq.*
3. Hemp Drugs Commission, vol. iii, p. 246.
4. DeCourtive: "Haschisch," Paris, 1848.
5. Moreau de Tours: "Du Haschisch," Paris, 1845.
6. W. B. O'Shaughnessy: "Preparations of Indian Hemp," Calcutta, 1839.
7. Beaumont-Small: Wood's Reference Hand Book of Medical Sciences, vol. ii, p. 648, 1901 edit.
8. Lapin, L.: Ein beitrage zur Kenntness der Cannabis Indica Jurjew, 1894.
9. Fraenkel: *Arch. f. Exp. Pharm. u. Path.*, vol. 49, Leipsig, 1903.
10. Hemp Drugs Commission, vol. i, p. 179.
11. Hemp Drugs Commission, vol. i, p. 263, *et seq.*
12. Crothers: "Morphinism," etc., 1902, p. 267.
13. Kane: "Drugs that Enslave," 1881, p. 210.
14. Hare: "Practical Therapeutics," 1907, p. 154.
15. Sollman: "Pharmacology," 1906, p. 206.

OTHER WORKS CONSULTED.

Le Chanvre Indien, Hastings-Burroughs, 1896.
Chomel: "Historie d. Plantes," Paris, 1782.
Royle: Materia Medica and Therapeutics, American Edit., 1847.
Tukes: Dict. Psychologic Med., 1892.
Zeitler, H.: "Uber Cannabis Indica," Erlangen, 1885.

THE RATIONAL TREATMENT OF ACUTE GLAUCOMA—IRIDECTOMY EMPIRICAL

BY AARON BRAV, M.D.,
Ophthalmologist to the Lebanon Hospital; Medical Director, the Trachoma Institute, Philadelphia.

When we consider the fact that glaucoma usually leads to partial and very often to total blindness, even under most careful treatment, the importance of this disease from the ophthalmologic point of view becomes self-evident. We have no specific in the treatment of this disease, as far as the removal of the causal factor is concerned, but we have in the domain of therapeutics medical as well as surgical means that will relieve the symptoms and maintain good vision for a long time, and in some cases bring about an approximate cure. Any measure therefore that will give relief, and rationally explain its direct aim, in the removal of the causal element, must be welcomed and tried by the profession. A rational explanation of the already accepted medical and surgical means, even though differing somewhat from the accepted theories, must be of some value in the discussion of the treatment of this rather common affection of middle age.

It is impossible, of course, to describe scientifically the treatment of this very important ocular affection, and at the same time convince the profession that the so-much-hailed Von Graefe's iridectomy cure is a piece of unnecessary, unreasonable empiric surgery, without considering first the symptomatology and pathology of the disease. The mistaken attitude of cause and effect, and the accepted, but not sufficiently demonstrated, filtration angle theory are the most potent reasons why we fail to consider the treatment of this disease from the point of view of rationality. We shall not in this paper discuss the so-called simple glaucoma, nor shall we have any reference to secondary glaucoma, the etiology of which is demonstrable to the naked eye, but we shall confine ourselves to the primary acute congestive variety, the causal factors of which are as yet not clearly understood. Nor shall we delve into the primary causation, but treat it as a condition. As to the causation, we are probably not wiser than the ancients. Our only advance in the matter amounts to the simple fact that the disease is not in the lens, as thought by Hippocrates and handed down to the beginning of the eighteenth century. This we owe to the researches of Brisseau, who in 1700 emancipated himself from the accepted idea that the disease is in the lens.

Let us now systematically discuss the following questions relative to glaucoma:

1. What are the cardinal symptoms that we wish to combat and cure if possible?
2. To what pathologic condition must we ascribe these symptoms?
3. What should be the aim in our treatment of this disease?
4. Why has iridectomy given relief in many cases?
5. Why is eserine the remedy *par excellence* in this disease?
6. Does eserine or any other drug applied locally actually reduce the increased intraocular pressure, and if so how is this accomplished?
7. Is the canal of Schlemm of great significance in the treatment of this disease?
8. Does a newly formed cicatrix provide better filtration than a well-stretched iris?
9. Is there not a much better medical treatment and a much less dangerous operative procedure if necessary than the iridectomy of Von Graefe?
10. How should we rationally treat acute cases of glaucoma?

The cardinal symptoms of acute glaucoma may be briefly stated as follows: Pain in the eyeball, radiating to the branches of the trigeminus nerve, the degree of which depends entirely upon the height of the intraocular pressure and the susceptibility of the patient; a congested eyeball varying greatly in different cases; anesthesia and loss of luster of the cornea; dilatation of pupil which does not react to light or accommodation; increase in the tension of the eyeball and blindness, partial or total, depending upon the stage of the

inflammation. For the purpose of this paper these are the chief symptoms that we are called upon to treat whenever a case of acute glaucoma presents itself for relief.

Having arrived at a positive conclusion in our diagnosis we naturally search for the cause that is responsible for these symptoms, and we find the cause well demonstrated in the fact that the tension of the eyeball is increased as a result of an increase in the intraocular fluids which beg for relief. In primary acute glaucoma no further search in the causation of this increase in pressure is necessary at the bedside, perhaps not even possible. On this authorities differ and numerous theories have been advanced from time to time, theories that give us no other clue for treatment except the relief from this increase in pressure. We must therefore ascribe all our symptoms to this pressure. Let us recall the simple physical fact that pressure in an artificially constructed ball would according to the laws of hydraulics produce a uniform effect upon all parts thereof provided the walls were of uniform density. In the human eye we have a globe the anatomical structure of which is not of an equal density and resisting force, but is rather weaker at its anterior and posterior poles. Pressure under such circumstances traveling in the line of least resistance exerts itself mostly either at the optic nerve or at the cornea. It is probably true that the optic nerve entrance is the weakest spot, yet it should be remembered that the temporary blindness in acute glaucoma is not caused by posterior pressure upon the nerve head, but rather by anterior pressure upon the cornea. The optic nerve is only affected after prolonged posterior pressure lasting for weeks or months, while the corneal transparency suffers at once, reducing the transmissibility of light as far as the formation of images is concerned within a few hours. Even the inflammatory symptoms are caused by the anterior pressure. The pressure within the globe being anteriorly directed pushes the lens forward, reducing and sometimes obliterating the anterior chamber. This reduction in the size of the anterior chamber is caused, not by the obstruction of the canal of Schlemm, but rather by the forward movement of the lens and the contraction of the iris, which becomes folded and retracted toward the periphery. In the normal eye the equilibrium between the anterior and posterior chamber is maintained by the pupilary opening which constitutes the chief communicating medium between the two chambers. The iris at its pupilary margin is not bound down to the lens but glides over it, allowing fluids to pass from one chamber into another.

But the iris has another function. In addition to regulating the amount of light that enters through the pupil, it also acts as a safety-valve to prevent pressure upon the cornea, thus maintaining a normal depth of the anterior chamber. A slight temporary increase in pressure which may at times be present is thus checked by the normal iris. The dilatation of this pupil—that is, the contraction of the iris—which is always present in acute glaucoma means a removal of this safety-valve, and the pressure is allowed to be exerted upon the cornea, causing an edema with a different refracting index and a subsequent reduction in the visual acuity producing partial or total blindness, depending upon the degree of pressure exerted upon the cornea.

One point of interest is this, that in all cases of glaucoma we find the anterior chamber shallow or obliterated, the lens pushed forward, and the iris also bulging forward, which of course must lead us to the conclusion that the pressure is from the posterior part of the globe and not in the anterior part—in other words, there is an increase in the vitreous rather than in the aqueous humor. If the increase were in the aqueous humor we would have a different picture: we would have a deep anterior chamber, an iris bulging backward, and a lens pushed back. The so-called canal of Schlemm would be more patulous. But clinical experience is evidence enough to prove to all concerned that the reverse picture is the usual finding, and we may say with certainty that the pressure comes from

behind, the lens crowding the tissues anteriorly, and of course obstructing the so-called filtration angle.

Having thus briefly stated the symptoms of acute glaucoma and having reached a reasonable conclusion in regard to the cause thereof—*i.e.*, pressure from behind the lens—the question that confronts us is, What should be our aim in the treatment of this disease?

1. To stop the pain, which often is excruciating, depriving the patient of sleep.
2. To combat the inflammatory symptoms.
3. To restore the visual function by clearing the corneal edema.
4. To reëstablish the function of the iris.
5. To restore the lens to its proper place.
6. To reduce the intraocular pressure and keep it reduced as far as possible.
7. To prevent recurrence and reëstablish the equilibrium between the two chambers.

These are the aims and objects of our treatment, and in proportion as we are able to accomplish this do we get relief from the symptoms that enables us to save the visual function of the eye.

It will at once be seen that all treatment must be directed to the removal of the pressure. Many operative procedures have been advocated for the relief of pressure. The most popular to-day is iridectomy, first introduced by Von Graefe. That iridectomy has been of value in the treatment of this disease has been claimed by the best ophthalmic surgeons, but the reasons for its modus operandi have been stated in different ways. Some attribute its good effects to the removal of a piece of iris and the reëstablishment of the circulation; others to the opening of the canal of Schlemm; Abadie to the section of the cornea paralyzing some nerves—none of which thus explain satisfactorily its therapeutic value. It should, however, be remembered that iridectomy is not an absolute cure for glaucoma. In chronic glaucoma it has been demonstrated that the medical treatment may accomplish good results. In acute glaucoma it is often successful as far as a cure is concerned. Furthermore, it must be remembered that even acute glaucoma yields very often to medical treatment, and what is more essential to consider, that after an iridectomy we still employ medicinal agents both locally and internally. Eserine is used in nearly every case after iridectomy. Iridectomy alone does not cure glaucoma; it arrests it temporarily by relieving pressure, which is simply due to the opening of the eyeball, removing some fluid, which in this case is the aqueous. The removal of pressure of course in many cases readjusts the circulation. The chief reliance in preventing a recurrence is on medical treatment, which is continued long after the iris has been excised. The removal of a piece of iris, however, is not rational. It is impossible to extend the coloboma to the extreme periphery, and then the function of the iris in preventing pressure upon the cornea by acting as a safety-valve in checking the forward pressure is destroyed. Furthermore, the operation has many disadvantages, and after all the chief pressure is not between the two chambers, but comes from the posterior part of the globe. The good that often follows an iridectomy I attribute first to the removal of some fluid from the eye; secondly, to the rest in bed, which is usually enforced after an operation; thirdly, to the instillation of eserine; and fourthly, to the general treatment.

There are of course some disadvantages in the surgical procedures that must be considered, namely: (1) The possibility of the development of cataract as a sequela to the iridectomy. (2) The dazzling and haziness which is often noticed as a result of the coloboma. (3) The cosmetic aspect of the eye. (4) The possibility of infection by a panophthalmitis and loss of the eye. (5) The possibility of rapid loss of vision, which has not infrequently been noticed after an iridectomy. (6) The possibility of an acute attack in the other eye, which also occasionally may happen in glaucomatous patients. (7) The destruction of the protecting power and function of the iris in preventing pressure again to come anteriorly and thus produce a new attack of acute glaucoma. It is quite clear to me

that the anterior chamber is better protected by an iris well intact that can be made to stretch well, than by an iris part of which has been removed.

Iridectomy is not always successful even in the early stages, and the literature abounds with reports of failures. In some cases a posterior sclerotomy has to be performed after iridectomy has failed to give relief. That iridectomy is not a cure for glaucoma is a well-recognized fact. In simple glaucoma it is no longer used by many ophthalmologists, who claim that the myotic treatment has given just as good result. My experience is entirely in favor of the myotic treatment. As a matter of fact new operations are devised, such as cyclodialysis, which of course is not more rational than iridectomy. It is quite evident that although iridectomy is practiced largely in the treatment of acute glaucoma, it is done so only because it is the accepted operation and not because of a sincere conviction of its rational and great value. Probably a great many cases of acute glaucoma would get well without any operative means by careful medical treatment. The statistics on the subject are very unsatisfactory. It is not possible to determine exactly the correct percentage of cases cured and improved, and failures and recurrences and partial failures. The failure in this disease is a relative term. Some clinicians use the word to signify total loss of vision, others again to cases with light perception or at best counting fingers, and consequently the statistics in such study mean very little. In fact the cases are not observed for a sufficient length of time to enable one to make an exact analysis.

That iridectomy is not a cure for even acute glaucoma may be gathered from the simple fact that quite often we meet patients who are totally blind in one eye as a result of glaucoma, and on examination we find the beautiful coloboma of the iris present, clearly demonstrating the fact that Von Graefe's radical cure has been applied to the case. Of course the possibility that the operation was performed too late to obtain a cure should be remembered. Considering, however, the number of cases treated medically that have preserved good and useful vision for years, one is not inclined to attribute any good result to the operation *per se*. That good results have been recorded from this operation is a matter of common knowledge. But the temporary, or even in some cases permanent, result obtained from an iridectomy is not due to an opening of the so-called filtration angle resulting from the artificially produced coloboma, but rather from the readjustment of the circulation following the removal of fluid after the corneal incision.

We cannot deny the fact that in this disease we find the canal of Schlemm partially or even totally obliterated, or obstructed, a fact that must be taken into consideration. The questions, however, arise: Is this obstruction of the canal the cause or the effect of glaucoma, and how is this canal obstructed? Is the obstruction of this canal merely the result of compression, or is it due to the formation of adhesions at the periphery of the iris to the lens, attributable to a low degree of inflammation and fibrous exudation?

Knies and Weber first called attention to the fact that in secondary glaucoma the angle of the anterior chamber is almost invariably found closed. Priestley Smith examined thirty-four specimens, and found the angle in the majority of cases closed; when not closed it showed signs of congestion and compression. In cases of short duration the base of the iris is found pressed against the margin of the cornea and ligamentum pectinatum, but it may be easily separated. In older cases the iris is adherent and often atrophied. Adhesions form most constantly and rapidly in the acute cases. The closure of the angle in this disease is an established fact. We are convinced, however, that it is the effect and not the cause of the disease. When the intraocular pressure pushes the lens forward toward the anterior chamber and dilates the pupil, the pressure upon the anterior angle causes a local irritation and a low degree of

inflammation with subsequent exudation and partial obstruction of the angle of filtration. Primarily there is only a compression of the canal after the adhesions form, but the intraocular pressure has been on the increase prior to the obstruction of the angle of filtration—in fact, the obstruction of the angle has been caused by the increase in the intraocular pressure. Of course, it is reasonable to suppose that the obstruction of the filtration angle helps to make up a vicious circle by preventing the normal outflow of fluid. Too much importance, however, must not be attached to the closure of this angle as a pathologic finding. Perhaps its importance from a physiologic point of view has been magnified.

Under ordinary circumstances whenever there is a complete obstruction of the venous system a venous stasis with subsequent edema takes places. The same, of course, would hold good in the eye. When, then, there is a complete obstruction of this outflow of venous blood we would necessarily have a constant stasis with subsequent edema and a continuous rise in the intraocular pressure, but as a matter of fact this is not the case. Glaucomatous eyes, even after the visual obstruction has been complete and the ball is stony hard, may be in a quiescent state for years without giving rise to any other symptom of venous obstruction.

The conclusion is plain: the significance of the canal of Schlemm has been overestimated and plays probably a very small part in the treatment of acute glaucoma. It should also be remembered that an iridectomy rarely opens the extreme periphery of the iris, and therefore the canal of Schlemm is not much relieved of its obstruction. Even in cases in which the iridectomy was perfect the excision of the iris and the subsequent healing process produce a fibrous cicatrix, and a filtration cicatrix is a cicatrix that does not filter; at least it does not filter better than a well-stretched iris. A newly formed cicatrix, if well organized, which would of course consist of fibrous tissue, would be more compact, less porous, and its filtration function reduced to a minimum—surely not enough to preserve the equilibrium of the intraocular pressure. A well-stretched iris in my experience is of more importance than a fibrous cicatrix. Eserine is, of course, the drug *par excellence* in accomplishing this desired result.

It is the experience of every ophthalmologist that eserine is the most effective drug in the treatment of acute glaucoma. While this is, however, a universally accepted fact that leaves no room for discussion, we may justly differ on the modus operandi of the drug. Why is eserine the drug *par excellence* in the treatment of this disease? How does eserine relieve the symptoms of acute glaucoma? The solution to these questions still seems to be based upon the accepted theory that it reduces intraocular pressure by opening the so-called filtration angle, making the canal of Schlemm more patulous, reëstablishing the equilibrium between the two chambers. This possible theory, it should be remembered, is based entirely on the primary principle that all the symptoms of acute glaucoma are the direct result of the obstruction of the canal of Schlemm. The conclusion is, of course, correct, but the premise is wrong. I feel, however, that while in many cases the canal of Schlemm is found to be obstructed, this is not the cause of the various symptoms of the disease, but rather a necessary sequel of the pathologic condition—*i.e.*, the pushing forward of the lens and dilatation of the pupil, or the folding of the iris. In other words, the obstruction of the canal is not a primary condition, and is therefore not a cause but rather the result of glaucoma. The question arises, Does eserine, when applied locally, actually reduce the intraocular pressure, and how is this reduction accomplished?

Observers differ greatly on this point. It is, however, an accepted idea that eserine at first increases and then reduces the intraocular pressure. The point of difference between the various observers must be attributed to errors in experimentation, faulty technique, and the unreliability of the

tenometer. Eserine is undoubtedly a very valuable drug in the treatment of glaucoma, but we must give a more rational explanation of its mode of action in order to fully comprehend its usefulness. In acute glaucoma we deal with a disease the symptoms of which are caused directly by an intraocular pressure that is directed anteriorly, namely, upon the ciliary bodies and the cornea. The cornea becomes hazy and opaque to such an extent that vision may be altogether destroyed. This blindness is not caused by optic atrophy or retinal changes, but is caused by the corneal edema. This is, of course, known to every ophthalmologist who has observed a glaucomatous eye that was practically blind during the acute stage and has been restored to normal vision by the employment of medicinal agents. This being the case, our efforts in acute primary glaucoma must be directed to reduce or minimize the pressure on the cornea. In order to reduce corneal pressure we must cause a counter-pressure backward, or by mechanical means check the forward pressure. This can be accomplished by placing a diaphragm in front of the cornea, which will to a great extent prevent the forward pressure. In the human eye we find such a diaphragmatic adjustment in the iris, which however, as the result of some pressure on the peripheral nerves, has caused it to retract, allowing the forward pressure free play. The reëstablishment of the natural usefulness of the iris prevents forward pressure upon the cornea. This can be accomplished by the myotic power of eserine.

Eserine when effective at once contracts the iris, forming a strong wall and thus checking any forward pressure upon the cornea. The iris acts as an inhibitory force, and while it protects the cornea it directs the pressure somewhat posteriorly toward the optic nerve. This, of course, accounts for the restoration of vision after the use of eserine. The corneal pressure being relieved, the corneal edema disappears and vision is restored. It also accounts to some degree at least for the ultimate diminution in vision resulting from the pressure upon the optic nerve. If the canal of Schlemm is a filtration angle some benefit in that direction is naturally obtained through the stretching of the iris, the folds of which have compressed it. Eserine thus accomplishes its work in two ways, chiefly by removing the pressure from the cornea, and secondarily by relieving the filtration angle which resulted from the folded iris. Eserine does not actually reduce the intraocular pressure, but it checks its manifestation forward. In relieving the cornea from pressure the observer perceives a reduction in the intraocular pressure to the touch of his finger. Eserine as we now understand it does not cure glaucoma and does not reduce tension, but it temporarily protects the cornea and the anterior chamber, and therefore relieves the inflammatory symptom.

From what we have learned of the value of the iris as a means to inhibit any pressure toward the cornea, and from the consideration of the various facts connected with this disease and our observation of the results of both surgical and non-surgical treatment, we are convinced that the iridectomy operation which has empirically been introduced by Von Graefe is of questionable value in the treatment of glaucoma. The operation is not free from danger—in fact, quite often serious damage is done to the eye. The cosmetic aspect may also be remembered. But the most serious complications, such as development of cataract, infection to the eye, iritis, and cyclitis, have not very rarely been encountered after an iridectomy for the relief of acute glaucoma.

There is a more simple and more rational surgical procedure, when surgical interference is required, that may well be the operation of choice in this disease, namely, posterior sclerotomy. The operation is less dangerous, does not require such a long time for healing, leaves the external appearance of the eye in a normal condition, and accomplishes the reduction in the intraocular pressure in an excellent way. The lens after a posterior sclerotomy recedes, relieving the anterior chamber from pressure. The anterior chamber soon becomes

normal, and as a result of the withdrawal of fluids from the eyeball the circulation readjusts itself, and the result is as good as in iridectomy. Of course, here too the surgical procedure is only to remove the temporary pressure, and must be accompanied by proper medicinal therapeutics. But the operation accomplishes the same as an iridectomy, with less danger and inconvenience to the patient.

The question may therefore be asked, How should we rationally treat acute glaucoma?

As stated above, all the symptoms of acute glaucoma are caused by the intraocular pressure which is directed forward. We must therefore endeavor to relieve ocular pressure even though the reduction is only temporary, and then all our efforts must be directed to prevent the further increase in the pressure after it is once reduced.

Whenever possible a posterior sclerotomy should be performed. This is a simple surgical procedure that can easily be performed even in the poorest home. This at once relieves the increased pressure and reëstablishes the iris reflex. The reduction in the pressure permits free circulation in the blood-vessels. The lens that was pushed forward now recedes to its proper position, and the anterior chamber is soon reëstablished. The inflammatory symptoms temporarily subside. This should at once be followed by the instillation of eserine. The relieved contracted iris stretches and reëstablishes its function, acting as an inhibitory force to prevent the forward pressure upon the cornea and ciliary bodies. Rest in bed for a few days, with saline laxatives and hot applications locally, will usually give the desired relief.

Our chief object, however, must be to prevent a return of the intraocular pressure after it has been reduced so as to preserve useful vision. In order to accomplish this purpose it is necessary to reëstablish permanently the circulatory equilibrium. This we may successfully do by drawing upon the body fluids, which can be accomplished by the combined method of free bowel movements and diaphoretic measures. We do not induce diaphoresis by medicinal agents, but by the physical means of the sweat bath. Several cases under my observation that refused operative interference have yielded wonderfully to the influence of the Turkish bath. The pain subsided, the iris which was under the influence of eserine contracted, and the symptoms of acute glaucoma disappeared. I had the pleasure to observe two cases that had only light perception in the glaucomatous eye when they came under my observation, fully restored to practically normal vision after two weeks' treatment with the combined method of eserine and the Turkish bath. In acute glaucoma the bath is a very important agent. When used in the early stages of the disease it will relieve the pain and enhance the efficacy of the physiologic action and therapeutic effect of eserine employed locally. It reduces intraocular pressure, by drawing upon the fluids of the body and readjusting the circulation, thus shortening the course of the disease. I have noticed the effect of the bath upon an iris that would not yield to eserine. The pupil became pin-point after the bath. During the acute stage the bath should be given every other day, and it will be found of excellent service where operation has been refused or where no operative procedure is advisable. But even after the inflammatory symptoms have subsided the bath should be prescribed weekly, as it is essential to prevent a recurrence by keeping the circulatory balance of the eye in proper equilibrium. Even after a successful operation, where the tension has been reduced by surgical means and even though the function of the iris has been well reëstablished, the sweat bath is a very useful after-treatment in keeping the reduced tension down to its equilibrium.

The following case will be of interest to show the utility of diaphoresis in the treatment of acute glaucoma:

Mrs. B. R., aged fifty-four, was treated for ten days by her family physician for neuralgia. As a matter of fact the patient complained of pain in the region of the

nose and forehead. When I saw her she had a fully developed acute glaucoma. She did not sleep for several days except when under the influence of morphine. Two days before I saw the patient I suggested to the physician, who spoke to me about the case, the possibility of acute glaucoma. At this suggestion the physician prescribed eserine, evidently without any effect. I saw the patient January 5, 1910, when she had only light perception in the affected eye and the inflammatory symptoms were very marked. On account of her general condition and the absence of her son operation had to be delayed for two days. I intended to do a posterior sclerotomy, which I believe to be the operation of choice. I advised her to take a Turkish bath, instilled eserine, and gave her a saline purge. She went from my office to one of the establishments and took a Turkish bath. When she returned the next day she told me her pain stopped while taking the bath, and that she slept well all night. On examination I found the pupil well contracted, the cornea less hazy, and vision 6/60. Within ten days (three baths) the eye became quiet, and with adjusting lenses vision was 6/6. Operation was refused. After the patient was discharged she was advised to take a bath every two weeks. Vision to-day with lenses is 6/6.

This case I have chosen to illustrate the usefulness of this measure in acute glaucoma. There is no doubt in my mind that the method is a rational agent in the treatment of this disease. I find also massage a useful adjunct in the treatment in order to keep the reduced pressure down by stimulating the circulation. Internally salicylates seem to have a favorable influence. The general condition of the patient must, of course, be considered and treated accordingly.

THE TREATMENT OF FRACTURES OF THE SHAFT OF THE FEMUR—END RESULTS.

BY W. L. ESTES, M.D., SOUTH BETHLEHEM, PA.

One must make a sharp distinction between good functional results, and satisfactory cosmetic *and* good functional end results, in estimating his success in the treatment of a fracture.

It may be asserted that after all it should be good functional results one should attain in treating fractures. If this is true, then one must differentiate his results into two classes: (1) Patients who, immediately after union, are able to use the affected member properly; and (2) patients who acquire good use of the member after comparatively long periods.

Every observant physician knows that the healthy human frame adapts itself readily to conditions of acquired asymmetry. Overlapping fragments, if firmly united, notwithstanding some shortening of the bone, change of the angle of support, and variation in the fulcrum and leverage, may, nevertheless, result in a condition which gives good function, in the sense of ability to use the member without any serious inconvenience, and without noticeable awkwardness of station or motion. It will require, however, in such cases, a long time for the member itself, and other parts of the body which are affected, to acquire the habit of good function. Good end-to-end reposition, without deviation of the angle of support, will require no new habits in balancing to be learned, nor any new tricks of the muscles to be acquired, in order to have proper motion and locomotion restored. Naturally, recovery will be much quicker in these latter cases, therefore.

Radiograms may be very misleading, frequently they lie most egregiously, if one may apply a form of speech to a visual deception. As reliable indications in every case, *x*-ray pictures were tried and condemned by a committee, appointed by the American Surgical Association to investigate and report on the value of Roentgenology.[1] This report was practically unani-

mously indorsed by all the members present when it was read. Unfortunately, the laity do not appreciate this, and it has become the custom of patients nowadays to insist upon an *x*-ray picture in order to be satisfied that a fracture has been properly set and accurately retained in position. It is difficult, and sometimes impossible, to convince these people that a good functional result may be expected, notwithstanding some inaccuracies of the reunited fragments.

Surgeons must face not only this almost universal desire for an *x*-ray picture of the fracture, but also the very probable mistakes, and therefore the gross exaggerations of slight deformities made by inexpert and ignorant *x*-ray operators. When, however, the *x*-ray picture is taken by an expert who knows anatomy, a radiogram is, at present, the most reliable check a surgeon can employ in determining the accuracy of the reposition in his fracture cases.

Until radiograms were employed systematically in every case to check the results of the setting of my fracture cases, I had gone on with this work in very great complaisance, and had convinced myself, and persuaded a number of other men, that I could set a fracture properly, and I would confidently expect a good result in the large majority of cases. There was usually a good deal of callus, which for a time caused a more or less bulge at the place of union, but in time this lessened, and apparently the bone was restored to its integrity and symmetry. Radiography has taken my conceit so completely away that I now undertake the treatment of a fracture with many misgivings, and with the belief that, do what I will, there will be some shortening and some deformity in nearly every case of fracture treated by the old methods. Modern conditions require the surgeon to be far more careful to obtain good cosmetic as well as good functional results.

This leads up to my thesis. Given the conditions of to-day, what methods are best to attain good and satisfactory results after fractures of the shaft of the femur?

The argument that the success which one surgeon has had for many years with a certain prescribed method should specially recommend it for adoption by surgeons generally, I think, does not hold. These selfsame methods cannot apply equally to a region of totally different climatic conditions and social variations. A wise surgeon will adapt his method to the individual case, considered in regard to the physical and psychical character of the case, and with reference to the environment of the patient, and always with due regard for the later, improved and tried suggestions of modern surgery. Besides, the honest statements of surgeons concerning their results are wholly misleading. I mean there is yet no certain graphic formula nor reliable picture which may be taken as a standard by which to gauge results. Many surgeons state their results in terms of so much shortening.

Dr. Jarvis S. Wight, in two papers in 1877 and 1878, called attention to the inequalities of the lower limbs.[2] About the same time, Dr. Thos. G. Morton proved the same thing. Dr. T. W. Huntington also confirmed this common variation in length of the lower extremities by a series of 61 measurements.[3] Dr. Algernon T. Bristow, of Brooklyn, was induced by this work of Wight to have the frames of 124 skeletons measured.[4] Dr. John B. Roberts had done this same work years ago with a like result,[5] namely, it was shown that the length of paired femora varied in the majority of skeletons, and that the variation was from 0.1 to over one centimeter.

Furthermore, the methods of measuring frequently employed are very inaccurate. The common one, the distance from the anterior superior spine of the ilium to the end of the inner malleolus, is perhaps the best method. Dr. W. W. Keen has pointed out the proper way of taking this measurement, namely, use the lower rim of the malleolus as the fixed point, hold the tape here, and measure to a line drawn horizontally, across the tip of the superior spine. without touching the skin above. This should be checked by measurements from the center of the umbilicus and the lower

end of the sternum, to the patella and to the malleolus. Respiratory movements, and varying conditions of distention of the abdomen, are apt to make any measurement from a point above the pelvis to the knee, or malleolus, inaccurate, if used alone. Dr. Gerrish recommends measuring from the incisor teeth (by allowing the patient to hold the tape between his teeth) to the knee and malleolus on either side.

I recently measured the lower extremity of a man who had a newly united fracture of the middle of the shaft of the femur. The fracture was a transverse one, and the union had occurred with angular displacement and a little overlapping, yet the measurement taken from the anterior superior spine of the ilium to the tip of the inner malleolus on either side showed but ¼ inch shortening. This measurement was taken with the greatest care and repeated several times. Obviously, this measurement was relatively incorrect and misleading. Upon investigation I found there was a marked difference in the level of the two anterior superior iliac spines. The pelvis was tilted markedly.

Some years ago I saw a man who walked with but a slight limp, who could walk long distances without inconvenience, who, with his trousers on, showed no deformity. This man had had an oblique fracture of the shaft of his left femur, it had united in a markedly overlapped position, and there was, by the ordinary measurement, a shortening of 2½ inches. This man might be said to have a good functional result.

The text-books and accepted authoritative writers on fractures are not sure, and are, as a rule, very far from clear, in regard to the very points which are the crucial ones respecting these fractures.

In 1890 the American Surgical Association appointed a committee to determine and report what should be considered satisfactory conditions, as the end result of simple fractures of the shaft of the femur.[6] This committee was composed of Stephen Smith, Chairman, D. Hayes Agnew, David W. Cheever, D. W. Yandell, Charles T. Parkes, P. S. Connor, Charles B. de Nancrede, and Hunter McGuire. In the transactions of the A. S. A. for 1891, Dr. Smith's report for the committee may be found. The conclusions, stated concisely, are as follows:

1. There must be firm bony union.
2. There must be correct axial relations of the fragments.
3. Correct relations of the anterior planes of the upper and lower fragments must be maintained.
4. Shortening must not exceed from ⅛ inch to 1 inch.
5. Lameness must not result as a consequence of shortening, over 1 inch.
6. The conditions attending the treatment, however, may prevent these satisfactory results.

This statement of the conditions of satisfactory end results is the one generally accepted as a standard. The last qualifying paragraph, however, brings the whole matter back to uncertainty, and may nullify all the previous standard conditions. "Conditions attending the treatment may in any given case make satisfactory results impracticable."

Dr. Thos. W. Huntington of San Francisco, in a paper read before the Medical Society of the State of California, on "Operative Treatment of Recent Fractures of the Femoral Shaft," April, 1908, and published in the *Annals of Surgery*, September, 1908, quotes replies of ninety-two (92) surgeons of the United States and Canada to questions in regard to fractures of the femur. Of these 92 surgeons, 69 consider shortening to the extent of one inch or more permissible; 19 limit the shortening to ¾ of an inch, and only 4 to ½ inch. "Appreciable overriding is considered permissible by 75; not permissible by 17."

In order to get some information at first hand, and directly, I sent inquiries to some fifty well-known surgeons of the United States and Canada, whose work and writings have shown them particularly qualified in this line, and who have not, in most instances, published their opinions on this subject in any set book or monograph. I received 25 replies. The questions were as

follows, and the replies are indicated under each question respectively:

First: Have you been uniformly successful in obtaining good cosmetic results in your cases?

16 answer: Yes.
9 answer: No.

Second: What do you regard as the permissible shortening after fractures of the shaft of the femur?

11 answer: ½ inch.
4 answer: 1 inch.
2 answer: No shortening is permissible.
3 answer: ¾ inch.
3 answer: 1 to 1½ inches.
1 answers: There is no way of determining the degree of asymmetry between the two extremities before injury, because normal legs differ very much in length.
1 answers: Only that which is absolutely unavoidable.

Third: What method of measurement do you employ in estimating shortening of the femur after fractures?

15 answer: Measure from the anterior superior spine to the inner malleolus.
3 answer: From the umbilicus to the internal malleolus.
1 answers: Careful measurements from the classic landmarks.
1 answers: The method of measurement I employ is to mark with a pen the bony prominences, and to make the various measurements from these points, without attempting to locate the bone by the sense of touch during the measuring.
1 answers: I pay very little attention to the absolute length of the femur or the extremity, because the femurs or the tibias of the injured limbs may be asymmetrical before the accident.
1 answers: Measure between the central incisors of the upper and lower jaws to the tip of the inner malleoli.
1 answers: *X*-ray shows best if any overlapping or shortening.
1 answers: Measure from the anterior superior spine to the upper margin of the patella.
1 answers: Measure from point of trochanter major to external malleolus.

Fourth: Do you always use anesthesia to reduce fractures of the femur?

8 answer: No.
12 answer: Yes.
1 answers: Use anesthesia in children and in very muscular adults (chiefly foreigners who resist greatly without "sleep"); otherwise I do not anesthetize.
1 answers: Rarely.
1 answers: The necessity for its use is determined by measurements and the *x*-rays.
1 answers: Not always.
1 answers: If crepitus is obtained without much pain to the patient, no anesthesia is used.

Fifth: Do you advocate some method of extension to be followed later by fixation, or do you employ a fixed dressing, say plaster casts, from the beginning?

8 answer: Extension.
1 answers: Always employ fixed dressings (plaster of Paris) from the beginning.
1 answers: In the lower two-thirds, I use after a preliminary treatment of Buck's extension and large sand-bags, either a plaster-of-Paris fixed dressing, or employ Brown's modification of Hodgen's apparatus.
1 answers: In children usually plaster of Paris; in adults Hodgkin's or Volkmann's extension splint.
1 answers: Buck's method in adults. Ether and plaster casts in children.
1 answers: Extension with sand-bags, or long splints with bran-bags instead.
1 answers: I practically always use the traction method with adhesive plaster, stirrup, and weight with the leg in horizontal, oblique or vertical position. Lateral or rotary displacement is prevented by using sand-bags or splints. After union is quite firm, the gypsum encasement is used as a fixed splint; later the patient is allowed to sit up and use crutches to walk, with the encasement on the limb.
1 answers: Fixed dressings late, if at all, in adults; from first in children.
1 answers: The early treatment always includes extension. Plaster splints may or may not be used later.
1 answers: Extension, if necessary, to bring end in apposition; then fixation.
1 answers: My choice method is to set the fracture through an open wound, then apply a Buck's, or some other form of extension. Then, perhaps, a plaster cast and walking on crutches.
1 answers: I employ fixed plaster casts (spica) in children, when the fracture is not too near the upper extremity; in these cases I use extension by suspension. In all other cases I have been in the habit of using Buck's extension for a period of five or six weeks in adults, followed by a light plaster cast.
1 answers: I use the Hodgen splint with some modification of my own; I use no dressings of any kind. A loosely filled sand-bag along the length of the thigh will control the muscular jerking during the first week; this also adds weight and increases the pull. It is very comforting in adults for the first

reason; it is always necessary in children for both reasons.

1 answers: I usually employ extension by the usual methods of weight and pulley, and after some three weeks put on a plaster spica bandage, but no extension is used where the fracture is plated.

1 answers: When available, I prefer a pneumatic splint.

1 answers: Primary extension usually in adults; plaster, practically, in children.

1 answers: I always put patients immediately after the operation for suture of the femur into a plaster-of-Paris spica.

1 answers: I am in favor of some method of extension followed later by fixation.

Sixth: What is the average length of time that you use fixation apparatus for fractures of the femur—(1) in adults? (2) in children?

2 answer: (1) 5 to 6 weeks; (2) 3 to 4 weeks.
2 answer: (1) 7 weeks; (2) 4 weeks.
5 answer: (1) 6 weeks; (2) 4 weeks.
4 answer: (1) 8 weeks; (2) 6 weeks.
1 answers: (1) 7 to 8 weeks; (2) 3 to 4 weeks.
1 answers: (1) 2 to 3 months; (2) 6 weeks to 2 months.
1 answers: Until bone is firm.
1 answers: (1) 6 weeks; (2) 5 weeks.
1 answers: (1) 6 to 7 weeks; (2) about 6 weeks.
1 answers: (1) 6 to 8 weeks; (2) 4 to 6 weeks.
1 answers: (1) 6 to 8 weeks; (2) 6 weeks.
1 answers: (1) 5 weeks; (2) 2 weeks.
1 answers: (1) 9 weeks; (2) 7 weeks.
1 answers: (1) 8 to 10 weeks; (2) 6 to 8 weeks.
1 answers: 8 weeks in both children and adults.
1 answers: I never use fixation dressings except in compound fractures, which should be fastened with wire plates or nails, to be removed, as a rule, after union is firm. In children under four years, plaster dressings should always give good results. I use the Hodgen from that age up.

Seventh: Do you advocate open, that is operative, measures for the reduction and the retention of fractures of the femur?

2 answer: Yes.
1 answers: Have seen good results, but little experience myself.
1 answers: Yes, in the upper third of the shaft.
1 answers: Not as a rule, but am guided by *x*-ray showings.
1 answers: I advise open operation where the *x*-ray shows that under extension there is much overriding.
1 answers: I do as a rule.
1 answers: Operate on all cases (if under suitable conditions) where ends of bone cannot be brought in apposition as shown by *x*-ray.
4 answer: Only in cases in which it is difficult to keep the fragments together.
1 answers: Yes, where there is evidence of separation of fragments as shown in *x*-ray.
1 answers: Occasionally.
1 answers: Only when proper approximation cannot be obtained under an anesthetic after the muscular spasms have subsided.
1 answers: Only in cases that cannot be retained without it, then only for reduction.
1 answers: Not as a rule.
1 answers: I do not advocate operative measures for reduction and retention, as a rule. But where there is delayed union or marked and crippling deformity, operation should be done.
1 answers: I do not advocate operative measures, at least by open incision, as a general method of treatment.
1 answers: I do not believe the open operation should ever for a moment be considered, except in compound fractures that cannot be reduced to a simple condition by primary closure of the wound; if the opening in the skin amounts to anything at all, there is great danger of infection and the wound should be freely enlarged, primarily for drainage; incidentally the bone should be fastened, as it makes the easy dressing while in the Hodgen still easier.
1 answers: When they cannot be reduced otherwise.
1 answers: Yes, when deformity persists in spite of extension.
1 answers: I do not advocate the open or operative method for fractures of the shaft of the femur, save in cases of compound fracture, and I would be guided by the extent of the injury and condition of the parts.
1 answers: In exceptional cases.
1 answers: I do not advocate open treatment, unless there be indications of greater force calling for it, than the fact that a fracture exists even with a probability of succeeding deformity.

Eighth: If you do not advocate the open method for general use, are there any special fractures of the shaft of the femur for which you prefer the open method?

1 answers: I have found no fracture of any part of the femur that could not be better treated with the Hodgen splint as I use it, than with any other form of apparatus.
1 answers: Only when specially indicated.
1 answers: I do not recall a simple fracture of the shaft in which I have considered it desirable to make it compound at the beginning of treatment; and I do not regret having pursued this plan.
1 answers: Upper ⅓ and intercondyloid.
1 answers: Fractures of the shaft.

1 answers: Where approximation cannot be obtained, in cases of non-union, and in cases of multiple fractures.
1 answers: It may occasionally be better than other methods, in fractures just below the smaller trochanter; but even here it is not often required.
1 answers: Fractures of the upper part of the shaft are the most difficult to keep together, and therefore the open method will be the most often resorted to.
1 answers: I do not advocate the open method for all cases; the special fractures for which I advocate this method are those in which the skiagram shows bad apposition of the fragments.
1 answers: In all cases in which there is great overlapping.
1 answers: I think operation especially indicated in any case in which full length of the bone cannot be obtained under anesthesia, and particularly oblique fractures.
1 answers: I advocate operative treatment for all but the special fractures of the femoral neck.
1 answers: I advise open operation where the *x*-ray shows that under extension there is much overriding.
1 answers: Compound and complicated simple fractures that cannot be reduced or retained.
1 answers: In the upper third of the shaft.
1 answers: Yes, compound fractures.
1 answers: Yes, upper third and lower third.
1 answers: In obstinate fractures refusing to remain reduced, or where muscular action prevents maintaining reduction. In some fractures close to great trochanter, and in many compound fractures.
2 answer: Open method used in cases of non-union, and in cases in which marked deformity exists.
5 did not answer this question.

It will be noted that 16 out of the 25 say they uniformly obtain good cosmetic results in their treatment of simple fractures of the shaft of the femur. Nine reply that they do not.

Twenty-one give, in answer to the question, "What do you regard as the permissible shortening after fractures of the shaft of the femur?" various degrees from ½ inch to 1½ inches shortening. Only two say there should be no shortening at all.

The answers to the third question are particularly interesting and important, I think. To this question, "What method of measurement do you employ in estimating shortening of the femur after fractures?" 15 answer that they measure from the anterior superior spine of the ilium to the tip of the inner malleolus. The others use various other bony prominences for their upper and lower landmarks. In the United States the measurement from the anterior superior spine of the ilium to the inner malleolus is the usual one. The difficulties of this one apply equally to the others. All of them are open to gross errors, and without extreme care and careful checking, by repeated and different measurements, they are practically useless as indicating the actual shortening which has occurred. Besides, shortening up to one inch and a quarter, as regards the other extremity measured in exactly the same way, of itself will not seriously incommode the individual, nor seriously interfere with function and usefulness of the extremity. The scope of this paper does not include (except to warn the unwary) extended discussion of this point. I have always been struck with the gross errors made by men endeavoring to measure the two lower extremities of a man, and I have frequently striven to get something like an accurate comparison unavailingly by the usual rough method. As was noted a little while ago, Morton and Wight showed that the two lower extremities of a man practically always vary in length, and Drs. Roberts and Bristow proved that the two femora of the same skeleton were rarely the same length. I have seen good functional results follow an apparent shortening of 2½ inches. I think I am warranted in saying that the actual shortening of an extremity after fracture cannot be determined by comparing its measurement with its fellow's length. If shortening does take place, it is due to incomplete restitution of fragments, or I had better say, shortening will inevitably occur, if in transverse fractures the two fragments are not apposed end to end, and retained in this position, or in oblique fractures if the beveling of one fragment is not made to fit accurately into that of the other and be held in this position until union occurs.

The testimony of nearly every surgeon is that some shortening does occur in practically all his cases. This must mean there-

fore that he very rarely succeeds in accurately reducing his fractures. Luckily, this does not make so much difference, except in transverse fractures. What does make a very great difference is *incorrect axial relations of the fragments.*

The importance of the fourth question is, therefore, evident. It is: "Do you always use general anesthesia to reduce fractures of the femur?" Twelve of my respondents answer unequivocally that it is their custom to use an anesthetic. Eight say they do not; the other 5 use an anesthetic under certain conditions.

My experience has shown that an anesthetic is absolutely necessary with a muscular adult if one purposes to really set the fracture at once. Those who advocate the gradual extension methods trust to them for restitution of the fragments. I have tried both ways, and I am sure I have had better success by reducing the fracture under anesthesia and then hold it with extension and apposition splints afterward.

The fifth question was, "Do you advocate some methods of extension to be followed later by fixation, or do you employ a fixed dressing, say plaster casts, from the beginning?" Twenty-two answer that some form of extension should be employed in the beginning. Two believe that fixed plaster dressings should be employed immediately, and one advocates a pneumatic splint. Except one, all the surgeons who advocate extension suggest some form similar to Buck's extension method or a modification of this. The one exception is Dr. Brown of Birmingham, who advocates the use of his modification of Hodgen's splint and extension method in all cases of fracture of the femur. Dr. Brown claims that when rightly applied the Brown-Hodgen splint is always successful in obtaining a perfect cosmetic and functional result. This is so extraordinary that I feel I must hold this method under trial a little longer before passing judgment on it. I have used the Hodgen method with satisfaction in some cases, but I have only recently obtained Dr. Brown's modification, and I am now trying it. I shall indeed be very glad if my success by its use shall approach the uniformly perfect results which Dr. Brown says he obtains.

The necessities in extension methods are: (1) The pull must be adequate, continuous, and painless; (2) the proper axis of the limb must be retained (that is, especially eversion or inversion of the foot shall be prevented); (3) the patient must be prevented from continually sliding down to the foot of the bed.

For many years I have been using a modification of Volkmann's splint, combined with Buck's extension. I find also counter-extension by a perineal band extended by elastic connection to the head of the bed a useful addition.

I quite agree with all the respondents that a plaster dressing in the later stages should be used.

The sixth question requires no discussion or amplification. The average time of treatment is stated as one usually finds it.

The seventh question, "Do you advocate open, that is operative, measures for the reduction and retention of fractures of the femur?" brings most interesting responses. Seventeen advocate open methods early, if any difficulty is found in reducing and holding the fragments in place. Only three specifically state they do not advocate and would not use open treatment for these fractures. These answers are illuminating and in my opinion show conclusively whither American surgical opinion is gradually tending in the modern treatment of fractures.

I think I am fair in saying that twenty-two of these twenty-five surgeons advocate the open method, not as a last resort, but as the proper method of reducing fractures of the shaft of the femur, either in the very beginning or just as soon as it is evident that the bones cannot be reduced or held in position by the old methods. Surgeons who have tried many times, and those who have studied radiograms of fractures, know that it is next to impossible to make actual coaptation of the fragments when the femur of a robust adult is broken at any point, without cutting down on the fracture and actually seeing the bones, and be able to remove the shreds and detritus which en-

velop and cover the ends of the fragments. Transverse fractures above the condyles, and fractures in the immediate neighborhood of the trochanter minor, always require the open method for proper reduction.

Two notable papers have been published in the last few years, one by Dr. Thos. W. Huntington, of San Francisco (*Annals of Surgery,* Sept., 1908), and one by Dr. John B. Walker, of New York (Trans. Amer. Surg. Assoc., 1909), advocating the open treatment of simple fractures. Lane, of London, has been employing the open method for fifteen years, and has finally so stirred the conservative British surgeons in discussing this question in the surgical section of the British Medical Association, that a resolution was passed "requesting the Council of the Association to appoint a Commission to inquire into the question as to the results obtained in the treatment of fractures by the operative and non-operative methods" (see *Lancet,* Aug. 13, p. 501).

The report of this Commission will certainly be a most interesting document, and ought to be one so thorough and unprejudiced that it will be convincing in its conclusions. Our own National Medical Association ought also to appoint a Commission to investigate this subject. If the reports from both of these great national associations should, by chance, in the main agree, few surgeons could then fail to understand the dictum of modern surgery.

I think, therefore, that the surgeon should nowadays understand and plainly tell his patient that unless a fractured femur is reduced by the open method there will almost surely be some deformity, prolonged disability, and maybe lack of proper function for many months. It ought also to be stated that the open method introduces a possibility of infection, but it is no greater than that from any other small operation, and with proper surroundings and technique it will very rarely occur.

My own experience and practice I find is inclined more and more to open methods of treating fractures. I have recently had good opportunities for comparing the results in fractures of the femur treated by the old methods and by open methods in the same wards, with the same attendants and assistants. I find the open method sure, as regards restitution of the fragments, much safer in retaining them, immeasurably more comfortable for the patient, and much quicker and more efficient in recovering.

The open method I would not recommend as a routine practice for children, but I think it is far best in most cases of adults who are treated in a clean and well-conducted hospital.

I have gone over the records of my accident cases in order to obtain some data. I find that of 1904 cases of fractures of all kinds, 137 were simple fractures of the shaft of the femur, and 93 cases were complicated fractures of the femur—that is to say, these 93 cases had fractures of the femur besides other severe injuries. Ten of these 93 cases died from their multiple injuries. Eighty-three recovered with useful limbs. Of the 137 cases of simple fractures of the shaft, one died of delirium tremens, one left the hospital with an ununited fracture, 135 were noted as cured, and had useful limbs. The shortening in these cases has varied from ¼ inch to 1¼ inches, this last degree in but a very few cases; ¾ inch has been the average. I think less than a dozen cases have ever left my hands with what I called an ideal result, viz., no appreciable callus, no shortening, no deformity, and perfect function. Only the last four years have I systematically kept radiographic records of these fractures. Unfortunately, it is very difficult to find many of the patients who come to us after they leave the hospital. I can, therefore, submit very few radiograms of the result of the treatment which have been taken some months after the patient left the hospital.

To sum up, my study and observation and experience have convinced me that very few fractures of the femur, treated by the old methods, make an ideal cosmetic and functional recovery. Restitution of the fragments which formerly was supposed to be good, nowadays, by the use of radiograms, I am convinced were faulty. Recovery is possible and function may be restored

only by the beneficence of a large ensheathing callus, and after the patient has practically learned a new equilibrium and locomotion by new adaptations of the skeleton and new use of the muscles. Some deformity is the rule.

The usual methods of measurements to show the result of union after fractures are themselves unreliable, and as asymmetry of limbs is the rule, comparisons of the two lower extremities after union may give very incorrect results from simply measuring their lengths. Correct axial adaptation of the fragments and correct restitution are possible only when the restitution of the fragments has been exact. This is the special object to be attained, and not the preservation of any increment of length, though femora are not shortened when union occurs after thorough setting and retention of the fragment. General anesthesia is necessary in setting fractures of the shaft of the femur in robust adult patients. Experience of the majority of surgeons shows that exact restitution can only be obtained in fractures of the shaft of the femur by the open method, to obtain actual sight of the fragments during the manipulations. Direct fastening of the fragments through an incision has been abundantly shown to be practicable, and with asepsis, perfectly safe. Direct splinting is the most efficient method of holding the fragments in place.

When fragments are accurately replaced and held firmly in position, union occurs without the usual "callus." Union is quicker, no deformity results, and the disability of the patient is materially shortened. Roentgenology has taught the laity to trust to the evidence of a radiogram as an indication of the result of the treatment of a fracture. Modern surgeons must meet this new view by the habitual use of the modern method which has been found most efficient in restoring the integrity of a bone, and which adds but very little to the danger of the treatment.

Finally, I would earnestly recommend, in consideration of the varying methods, reports, and results obtained by American surgeons, that this section requests the House of Delegates to pass a resolution requiring an investigation of the treatment and end results of fractures of the femur, and the appointment of ten members, who shall, after careful and thorough investigation and consideration, report upon, first, whether the present end results obtained by surgeons in the treatment of fractures of the shaft of the femur are satisfactory in most cases; and, second, whether the open method of treating these fractures shall be recommended or condemned.

List of men who answered questions on Fractures of the Shaft of the Femur, to whom I offer sincere acknowledgments and grateful thanks:

1. George E. Brewer, M.D.
2. George S. Brown, M.D.
3. Joseph D. Bryant, M.D.
4. A. T. Cabot, M.D.
5. Duncan Eve, M.D.
6. F. H. Gerrish, M.D.
7. John H. Gibbon, M.D.
8. M. L. Harris, M.D.
9. Richard H. Harte, M.D.
10. T. W. Huntington, M.D.
11. August F. Jonas, M.D.
12. Walter Lathrop, M.D.
13. Robert G. LeConte, M.D.
14. G. H. Monks, M.D.
15. John C. Munro, M.D.
16. Edward H. Ochsner, M.D.
17. A. Primrose, M.D.
18. Joseph Ransohoff, M.D.
19. John B. Roberts, M.D.
20. Charles Scudder, M.D.
21. Harry M. Sherman, M.D.
22. Charles E. Thompson, M.D.
23. George T. Vaughan, M.D.
24. A. VanderVeer, M.D.
25. DeForest Willard, M.D.

BIBLIOGRAPHY.

1. Transactions of Amer. Surg. Association, 1900, vol. xviii.

2. Inequalities of the Lower Limbs. Jarvis S. Wight, *Archives of Clinical Surgery*, Feb., 1877, vol. i, No. 8. Proceedings of Med. Soc. Co. King's, Jan. 21, 1878.

3. Treatment of Fractures of the Shaft of the Femur. Thos. W. Huntington, *Annals of Surgery*, Sept., 1908.

4. Observations on the Inequalities of the Right and Left Femur. Algernon T. Bristow, Trans. Amer. Surg. Assoc., 1908, vol. xxvii, p. 429.

5. Variations in the Length of Femora of the Same Skeleton. John B. Roberts, *Phila. Med. Times*, Aug. 3, 1875.

6. Report of the Committee on Fractures of the Femur. Transactions of Amer. Surg. Assoc., 1891.

EDITORIAL.

THE TREATMENT OF THE BLOOD-VESSELS IN THE PRESENCE OF RENAL DISEASE.

It has come to be pretty well recognized that once parenchymatous nephritis or interstitial nephritis has developed, the physician can do little as to cure but a good deal in the way of delaying the pathological process, particularly in the interstitial type. Unfortunately, the chronic parenchymatous type usually runs a course of not more than eighteen months or two years. One of the most important functions of the physician during the progress of either one of these forms of chronic renal disease is to regulate the condition of the heart and blood-vessels. The heart frequently undergoes considerable hypertrophy, and the blood-vessels are so commonly thickened and the blood-pressure is so materially raised that distinctly abnormal circulatory states are fairly constantly present. Under these circumstances the employment of nitroglycerin, or nitrite of soda, and in certain well-selected cases the use of the iodides, are most valuable measures. So, too, it is not to be forgotten that rest in bed, for many of these patients, is a far more valuable therapeutic measure than a journey for the purpose of recovering health, and if this rest is associated with the use of purgatives and diaphoretics and a properly regulated diet, quite remarkable changes for the better can be produced in the functions of the kidney.

There can be little doubt that the revulsion of feeling at the excess of bloodletting, in its various forms, a hundred years ago has resulted in our employing these measures too rarely. Recently, Morison, in *The Practitioner* for June, 1910, discussed our ability to influence the circulation in the kidney by external measures. It was urged at one time that counter-irritation or bloodletting over deeply situated viscera had little or no influence over these organs because there was no direct communication between the blood-supply of the internal organs and the surface of the body. But as Morison points out, Professor Turner, who for so many years was the distinguished Professor of Anatomy in the University of Edinburgh, showed as long ago as 1863, in the *British and Foreign Medico-Chirurgical Review,* that there is a free communication between the visceral and parietal circulation in the abdominal region by way of the subperitoneal arterial plexus. Much more recently he states that Renault and Tuffier have shown that local bloodletting and dry-cupping over the kidneys are capable of direct therapeutic effect because of anastomosis of the venous plexuses of the triangle of Petit with the veins of the kidney and its fatty capsule.

He states that Geberg, quoted by Testut in his well-known book on Anatomy, has also described arteriovenous anastomosis of this nature. In other words, these important anatomical facts show that these somewhat ancient methods of treatment rest upon a scientific basis and are justified in medical practice. Our own experience has been that in the congestion of the kidney present in acute nephritis after exposure to cold and in the renal stasis which is characteristic of valvular diseases of the heart with ruptured compensation, dry cups placed over the kidneys are very distinctly advantageous, and Morison cites cases illustrative of the advantageous results obtained by this means, and reiterates his belief in the old-fashioned but valuable method of treating the enlarged liver of ruptured cardiac compensation by applying leeches to the hypochondrium. These various methods when applied over the kidneys often result in increased flow of urine and in the diminution in the number of red cells which are found in it on microscopical examination. So, too, general bloodletting in the uremia of renal disease is beneficial, in his opinion, not only because it gets rid of a certain amount of poison-ladened blood, but also because it relieves renal congestion. J. Rose Bradford has pointed

out in his article in Allbutt's System of Medicine that the value of bloodletting is most marked in those cases of uremia which complicate acute or recent kidney disease.

In regard to the value of rest in these cases, it is not to be forgotten that rest diminishes tissue waste and so decreases the labor of the kidneys. It also lowers arterial pressure, dilates peripheral capillaries, and so diminishes the labor of the heart. As rest is usually taken in bed, the surface of the body has no opportunity of being chilled, and the kidneys are not congested by the blood being driven from the surface to internal organs.

THE STATE OF THE BLOOD IN CARDIAC DISEASE AND ITS BEARING ON TREATMENT.

It not infrequently happens that patients present themselves suffering from ruptured compensation, which has developed in the course of valvular disease, who also suffer from a very considerable degree of anemia which may be overlooked unless the physician is one who is careful to make routine examinations of all portions of the body when a case presents itself for study. Even when a considerable degree of anemia is discovered it sometimes happens that the physician fails to appreciate its importance as an etiological factor in the case. A moment's thought makes the fact evident that the administration of cardiac stimulants to anemic patients, however advantageous their administration may be in other instances, will be followed by little improvement unless the state of the blood is bettered. Most of the drugs which act as valuable remedies in cases of ruptured compensation do good not only by regulating the cardiac mechanism but also by increasing the nutrition of the heart muscle by an improvement in its circulation, and if the patient is anemic the heart muscle is supplied by a fluid from which it is difficult for the heart to obtain the required quantities of oxygen and nutriment. Most of the acute infectious diseases produce a very considerable degree of secondary anemia, and this is particularly true of rheumatism, which, in turn, is the most frequent cause of valvular lesions. The deduction is therefore that these patients not only need digitalis, or strophanthus, and rest, but that they also need a course of iron and arsenic with sunshine and as much fresh air as their condition permits. Attention to this collateral condition of anemia is often followed by an improvement which cannot be otherwise obtained.

DEATH AFTER RECTAL ANESTHESIA.

Many years ago we expressed the view that the production of surgical anesthesia by the introduction of ether into the rectum was entirely unjustifiable on the ground that it was uncertain, that it required a large amount of ether, and that accidents from distention of the gut were liable to occur. In the *Boston Medical and Surgical Journal* of March 24, 1910, Cunningham reports a case in which the use of ether by the rectum, in order that an epithelioma of the lip might be removed, caused death, although there was no diarrhea for twelve days prior to the operation and nothing abnormal was noted regarding the stools.

The anesthesia produced by the injection was unsatisfactory, although the patient experienced no pain. Immediately after the operation there was great abdominal distention, which could not be overcome by the rectal tube or by the application of poultices to the abdomen, neither could high injections produce removal of the gas. Death took place three days after the operation, the condition of the patient being that usually met with in general peritonitis.

The man at autopsy was found to be suffering from amebic dysentery, and while there were no distinct perforations of the gut, there was a peritonitis apparently due to the passage of the ether, with fecal matter and other infecting material, through minute perforations in the thin-walled ulcers which were scattered throughout the large intestine. It is also possible that the pressure of the ether vapor by simply dis-

tending the floors of these ulcers permitted infection to occur.

It seems to us that this case, combined with some others which have been reported, should do much toward preventing this method of practice; the more so as Cunningham quotes Anshutz and Baum as reporting a case of perforation of the cecum, as a result of a rupture of a tubercular ulceration, following ether administration by the rectum, this patient also dying of peritonitis.

PHENOLSULPHONEPHTHALEIN AS A MEANS OF DETERMINING THE FUNCTIONAL ACTIVITY OF THE KIDNEY.

The importance of determining the functional activity of the kidney, long recognized by the internist and roughly determined by qualitative and quantitative tests, has lately been greatly accentuated by the dependence of modern kidney surgery upon a more accurate diagnosis not only of gross pathological lesions and of their unilateral or bilateral development, but also concerning the probable ability of the kidney to withstand surgical shock and the quantity of competent renal tissue likely to be left after surgical intervention. With the advent of ureteral catheterization came the possibility of determining not only total renal function, but that of each organ.

It has been shown that normally the work done by each kidney is about the same if observations be continued through a considerable length of time, whilst a study, for instance, of the fifteen minutes' secretion may show marked differences. Diseased kidneys usually, but not always, imply such modifications in function as are characterized by changes evidenced by microscopical and chemical examination of the excreted fluid. Such changes in association with clinical symptoms are usually sufficiently pronounced to justify diagnosis. It is worthy of note that similar alterations from the normal occur in the absence of any demonstrable change in the renal substance. It is universally acknowledged that quantitative analyses are serviceable only when taken in conjunction with elaborate and time-consuming metabolic studies which imply, moreover, special skill and laboratory facilities.

Rowntree and Geraghty (*Journal of Pharmacology and Experimental Therapeutics,* July, 1910), in an admirable study of renal function, note that the ideal functional test should indicate within narrow limits a constant amount of work performed by all normal kidneys under normal conditions; constant variations in function where constant abnormal conditions are present; functional alterations independent of the histological appearance where such conditions exist. It should afford an indication of the absolute work accomplished as well as the relation of this to the normal standard under all conditions. It should be mathematically accurate, easy of interpretation, technically simple, free from immediate or remote injurious influence, and should not only be capable of indicating the work executed under normal conditions, but also should be capable of revealing the latent or reserve force which can be utilized by the kidney under strain.

Since it has been shown that in health the kidneys will perform so much work within certain narrow limits, it is possible to establish definite standards of work for the kidney to which all normal kidneys under normal circumstances will conform. Knowing the normal standard a basis of comparison for the work performed by the diseased kidneys is afforded.

As to cryoscopy, Rowntree and Geraghty observe that whilst it is probably the most accurate way of obtaining the molecular concentration of total solids excreted, so many factors influence this—for instance, diet, water intake, etc.—that no real assistance is gained from this method of study of the urine alone, though comparative cryoscopy of the blood and the urine is of more value as indicating renal functional efficiency.

Electrical conductivity is a test which has not been thoroughly used. It determines the amount of salts in the urine and

is estimated in ohms of resistance, and since it is entirely dependent upon the ions in the solution it takes into account principally the mineral content of the urine. It implies an expensive apparatus, special study, skill gained only by long experience.

The methylene-blue test, administered by intramuscular injections of 15 minims of a 5-per-cent solution, should appear in the urine in about fifteen minutes as a chromagen, the presence of which is easily demonstrated by boiling after the addition of a little acetic acid. At the end of a half-hour the dye begins to appear as such in the urine. The excretion of methylene blue continues in both forms for from thirty-six to forty-eight hours, and in some instances as long as six days, even in health. The time of appearance is delayed, as is also the time of maximum excretion, and the duration of excretion is much prolonged in disease of the kidneys. It has been shown that it is usually normal or even accelerated in cases of acute or parenchymatous nephritis.

Methylene blue is painful when given subcutaneously, sometimes even when given by intramuscular injection. A long period of observation is necessitated, and also a large number of examinations of the urine. The color of the dye as excreted does not lend itself well to colorimetric methods of estimation. Moreover, unknown chemical changes take place in the body, only about 50 per cent of the dye being normally excreted in the urine. Occasionally it is completely destroyed in the body even in health and cannot be demonstrated at all in the urine. The test is regarded as cumbersome and, comparatively speaking, rough.

The indigo-carmine test, the drug having been shown by Heidenhain to be excreted by the epithelial cells of the convoluted tubules, is executed by injecting 20 Cc. of a 0.4-per-cent solution into the muscles of the gluteal region. If a stronger preparation be used the indigo-carmine does not remain in solution, but appears in the form of a fine suspension. Normally the urine becomes tinged a greenish-blue ten to fifteen minutes after the injection and subsequently becomes a deeper greenish-blue, and a quick elimination occurs. The elimination is completed in from twelve to twenty-four hours. In disease of the kidneys the appearance is delayed and elimination prolonged. When ordinary doses are used not more than 25 per cent is excreted by the kidneys. This is a more valuable test than methylene blue because of its more rapid appearance and quick elimination.

Rosaniline is employed by injecting 1 Cc. of a one-per-cent solution subcutaneously. It always appears in the urine in less than half an hour. The maximum intensity of color is reached during the second or third hour. The total elimination is complete in twenty to twenty-four hours. The quantity eliminated varies from 65 to 95 per cent. In acute parenchymatous nephritis the drug appears as early as in normal cases. In interstitial nephritis the appearance is delayed and the time of elimination prolonged. The greatest advantage of rosaniline would seem to be its almost entire elimination by the kidneys. The test has never attained popularity.

Phloridzin is used to show the functional activity of the kidney from the standpoint of its glandular function, and therefore differs from all other tests. It consists of the subcutaneous administration of 5 mg. of a freshly prepared aqueous solution of phloridzin. This is followed in twenty minutes to half an hour by the appearance of sugar in the urine. The glycosuria increases in intensity and reaches its maximum in one hour, and then gradually diminishes, disappearing in two or three hours. Normally two or three grammes are excreted during the test. The sugar output is estimated every fifteen minutes, and thus the curve of elimination is obtained. In the presence of renal disease the glycosuria is entirely absent or delayed in appearance, slower in reaching a maximum, and the amount eliminated is decreased. It has been repeatedly shown that at times no glycosuria followed the injection even when administered to normal individuals. It is too sensitive to slight renal changes and frequently furnishes an exag-

gerated idea of the extent of the renal lesion. Moreover, solutions of phloridzin rapidly deteriorate and only fresh solutions can be utilized.

Rowntree and Geraghty state that their investigation of the renal function by means of phenolsulphonephthalein originated from a research of Abel and Rowntree upon the phthalein family. The drug is prepared as a bright-red, crystalline powder, somewhat soluble in water, more so in alcohol, insoluble in ether. The dilute alkaline solution is of a purer red than the phthalein, and a more strongly alkaline solution is purple. It is readily soluble in solutions of sodium carbonate and has a stronger avidity as an acid than phenolphthalein.

Abel and Rowntree have shown that properly prepared solutions of sodium salt can be injected under the skin without the slightest evidence of an irritant action, and that the administration of the drug 0.1 gramme or less by mouth is followed by its appearance in the urine in one to one and a half hours; that the subcutaneous administration is followed by its appearance in the urine in from one to ten minutes. Following the subcutaneous injection of 1 gramme the drug appears in the bile in high concentration in one or two hours. It is then reabsorbed by the large intestine and only a trace of these large doses can be found in the stool. In no case was any irritant action upon the kidneys detected. From all the evidence adduced it is apparent that the phenolsulphonephthalein is devoid of toxicity, probably more so, the authors state, than sodium chloride.

As to the technique of the test, twenty minutes to half an hour before administering it the patient is given 300 to 400 Cc. of water in order to secure a free urinary secretion, otherwise delayed urinary appearance may be due to lack of secretion. Under aseptic precautions a catheter is introduced into the bladder and the latter is completely emptied. Noting the time, 1 Cc. of a carefully prepared solution of phenolsulphonephthalein containing 6 mg. to the cubic centimeter is administered subcutaneously. The urine is allowed to drain into a test-tube in which has been placed a drop of 25-per-cent NaOH solution, and the time of the first faint pinkish tinge is noted.

If the patient be without urinary obstruction the catheter is withdrawn at the time of the appearance of the drug, and the patient is instructed to void into a receptacle at the end of one hour and into a second receptacle at the end of the second hour. In prostatic cases the catheter is left in until the end of the observation. The catheter is corked at the time of the appearance of the drug in the urine, and the cork is removed at the end of the first hour and at the end of the second hour, each time the bladder being thoroughly drained. Each sample of urine is measured and the specific gravity taken. Sufficient NaOH is added to make the urine decidedly alkaline in order to elicit the maximum color. The color displayed in the acid urine is yellow or orange, and this immediately gives place to a brilliant red color when the solution becomes alkaline. The solution is placed in a liter measuring glass and water added to make accurately one liter. It is then thoroughly mixed and a small filtered portion taken to compare with the standard which is used for all these estimates.

The standard solution used for comparison consists of 3 milligrammes diluted up to 1 liter and made alkaline by the addition of one or two drops of a 25-per-cent NaOH solution. This is a beautiful purplish-red solution, retaining its intensity of color for weeks or for an indefinite period. By means of a colorimeter accurate quantitative estimates of the quantity eliminated can be made. As the result of a study of many normal cases it was found that when 6-milligramme doses were used the time of appearance of color varied from five to eleven minutes, and that 40 to 60 per cent of the drug was excreted in the first hour and from 5 to 20 per cent in the second hour. The excretion of the drug does not run parallel to the excretion of water. In many instances a high output was observed when the amount of urine was small. In other cases this condition was reversed. It is immaterial in so far as the excretion

of the drug is concerned whether the urinary output is 200, 400, or 500 Cc.

The authors have shown that the time of appearance and the percentage of output in the phthalein test are practically the same for the two healthy kidneys. When one kidney only is diseased the time of the appearance of the drug is delayed and the amount excreted is not only relatively but absolutely decreased. The time of delay in appearance is of comparatively little value; reliance is only to be placed upon the quantity excreted during a period of at least one hour. It is possible by using large doses and extending the observations for a period of two hours, each side being collected separately, to demonstrate in some degree the reserve functional ability of each kidney. Although in the majority of the cases of unilateral disease the combined output is equal to that of two normal kidneys, the greater part of the excretion is shown to be performed by the healthy kidney. In proportion to the decrease in function on the diseased side, approximately there is a proportionate increase in the function on the healthy side. In such cases following nephrectomy the remaining kidney eliminates an amount of drug which is normally excreted by two healthy kidneys. In all cases studied the output from the remaining kidney has been more than from the two kidneys prior to operation.

As a result of the most careful clinical study covering a great variety of kidney affections Rowntree and Geraghty hold that the phenolsulphonephthalein test has many advantages over all other functional tests so far proposed, since it appears early in the urine and is completely eliminated by the kidney, and since the quantitative estimation of the amount of drug excreted is simple and exceedingly accurate.

The permeability of the kidney for this drug is decreased in both chronic parenchymatous and chronic interstitial nephritis, the decrease being most marked in the interstitial variety.

The test has proven of great practical value in revealing the true renal condition in cases with prostatic obstruction. It is here of more value than the urinary output, total solids, urea, or total nitrogen, and enables the surgeon to select a time for operation when the kidneys are in good functional condition.

Making due allowance for what might be called parental enthusiasm and negativing the mental influence produced by a terse and forceful style, a study of the clinical experience briefly abstracted from Rowntree and Geraghty's paper is as convincing as a first communication can ever be of a new procedure. Because of its simplicity and apparent accuracy it is at least assured of a prompt trial.

PANCREATIC REACTION.

The pancreatic reaction, known generally as Cammidge's test, heralded by Cammidge and Robson as a means of formulating a diagnosis in both acute and chronic pancreatitis, has failed all who have attempted it with the exception of its discoverer. One of the best studies on this subject is contributed by Russell (*British Medical Journal,* July 2, 1910), who has for the second time taken up the examination of the urine by Cammidge's method to ascertain whether it would facilitate differential diagnosis in abdominal cases. He notes that the pancreas is essentially the great secretory gland, and that apart from the severe forms of inflammation it may be fairly postulated that other pathological changes can hardly be expected to do more than influence its secretory function. Diminution or increase in quantity of one or other or all of its ferments can be thought of only as affecting the process of digestion in the intestine. There is no failure of excretory function to be considered. Any absorption from the gland must be the absorption of some of its secretion or of an altered enzyme, and the enzymes are protein bodies, not carbohydrate bodies, and presumably cannot be the source of the substance in question.

Russell has tabulated 78 cases which exhibited abdominal symptoms or definite abdominal lesions, with the idea of ascer-

taining whether any assistance was to be obtained from the presence or absence of a reaction in making a differential diagnosis. The cases were selected in which it was thought that the reaction might be helpful in one or other direction. As a result of a study of these cases and some others employed as controls he notes that a positive Cammidge reaction may be obtained from the urine of persons in good health; that it may be obtained from the urine of persons suffering from a great variety of abdominal disorders or diseases; that it may be present in other diseased conditions; that it may be present when autopsy shows that the pancreas is not the seat of any anatomical change. All this definitely excludes pancreatitis as the cause of the Cammidge reaction. It may ultimately be found that the reaction is of some value as an index to the state of intestinal digestion, but so far it has been impossible definitely to establish any such relationship.

Russell states that the Cammidge reaction is one of a number of urine reactions which may accompany alimentary error. To claim for it any higher position in the field of diagnosis or prognosis is not warranted, and from our knowledge of pathological and physiological chemistry the claim has the appearance of being devoid of reasonable support; practically tested it signally fails.

In contrast with Russell's findings are those of Cammidge published in the same number of the *British Medical Journal*. He states that he has in his records over 1500 samples of urine derived from 1475 cases, the large majority having been sent to him by medical men from various parts of the country for diagnostic purposes. There were 13 cases of acute pancreatitis, all of which gave a positive pancreatic reaction. Six were operated on with three deaths. Examination of 264 specimens of urine in which gall-stones were found at operation showed the positive reaction in 56 per cent. When the gall-stones were in the common duct the reaction was positive in 69.6 per cent. Of the cases in which bile was found in the urine, 71 per cent gave a positive reaction, and out of the non-jaundiced cases 66.6 per cent. Cammidge regards a more or less marked reaction for urobilin as a valuable indication of gall-stones in the common bile-duct, especially when they are floating. Nine of the cases which gave a positive reaction pancreatically during life were examined post mortem and the diagnosis of pancreatitis confirmed microscopically.

Cammidge is opposed to the belief that the commonest cause of pancreatitis is cholecystitis, the inflammation spreading by way of the lymphatics from the inflamed gall-bladder to the head of the pancreas.

In 53 cases of catarrhal jaundice there were 42 positive pancreatic reactions, suggesting, according to Cammidge, that in rather over 79 per cent the condition was associated with some active degenerative change in the pancreas. Fifteen of the cases giving a positive reaction were submitted to operation because of the persistence of the jaundice. In all of these the pancreas was found to be enlarged and departing from normal.

Specimens of urine from 50 cases of ulcer of the duodenum and 47 of the stomach gave in the former case a pancreatic reaction in over 50 per cent, in the latter of over 10 per cent. A positive reaction was obtained in 8 out of 13 cases of sprue, and 4 out of 6 cases of pernicious anemia. In 21 cases in which the clinical diagnosis was cirrhosis of the liver and pancreas, 14 gave a positive reaction. All of these were operated upon, and in one a post-mortem examination was made.

In the large majority of cases Cammidge states that the results of the pancreatic reaction were borne out by the clinical condition and observations made at operation, or in the post-mortem room. Of 73 cases diagnosed as cancer of the pancreas, 33 per cent gave the positive reaction. In a miscellaneous group of 467 cases 461 gave a negative pancreatic reaction. Urine from 50 presumably normal individuals gave a positive reaction in no instance. Cammidge believes that the claim he originally made for his reaction, that it is clinically useful,

is corroborated. He does not believe it is pathognomonic or that taken alone it will enable a correct opinion to be formed in every instance, but that when the results of examination of the urine are considered in conjunction with the clinical symptoms and the analyses of the feces, a trustworthy diagnosis is capable of being arrived at in nearly every case of pancreatic disease. A single positive reaction cannot be accepted as a conclusive indication of a pancreatic affection, but is strong corroborative evidence of clinical signs pointing in that direction.

Cammidge assigns to examination of the feces great importance in making a diagnosis of pancreatic affections. He alludes to the frequent bulky soft white motions of advanced pancreatic disease with the peculiar odor resembling rancid bacon, and observes that they are rarely seen since in the majority of pancreatic diseases, apart from those associated with biliary obstruction, the feces show no characteristic change to the naked eye. As a rule the stools in pancreatic disease are acid. When alkaline there is commonly an associated biliary obstruction or an intestinal catarrh. The average percentage of unabsorbed fat is abnormally high. In some early cases the fat content was much below the normal limit. The relation existing between the percentages of unsaponified and saponified fats is important. In normal cases the saponified and unsaponified fats are present in approximately equal amounts. Interference with the functions of the pancreas increases the proportion of unsaponified fats, whilst obstruction to the bile flow and intestinal catarrh raise the percentages of saponified fats.

In regard to bile pigment Cammidge shows that ocular inspection is not sufficient to exclude its presence in the feces. He observes a more or less marked reaction from hydrobilirubin was obtained in all his cases except 22 of malignant disease of the pancreas; even in one case of cancer of the common bile duct, though the feces were quite white to the naked eye. In cases of biliary obstruction from gall-stones the intensity of the reaction varied with the jaundice, but traces at least were found in every one, showing that rarely if ever does impaction of gall-stones in the common duct produce absolute blocking. Out of 38 cases of cancer of the pancreas complete obstruction of the duct was met with in 22. Traces of hydrobilirubin were met with in 13, and in three only was a well-marked reaction obtained. In this last three the growth was situated in the tail or the body of the gland. As a rule malignant disease of the common bile-duct and gall-bladder does not produce as complete a blocking of the bile flow as is associated with cancer of the head of the pancreas.

As to occult blood, this was found in 22 out of 25 cases of malignant disease of the intestine; in 18 out of 23 cases of growth of the stomach; whilst in 21 cases of duodenal ulcer it was found only in 5, and in 16 cases of ulcer of the stomach only in 5. Occult blood was found in 25 of the 38 cases of cancer of the pancreas.

As to the insufficiency tests Cammidge notes that they indicate only very gross changes in the digestive functions of the pancreas.

As further bearing on this topic Wilson (*Surgery, Gynecology and Obstetrics,* August, 1910) from the result of 504 tests concludes that even when the most elaborate care is exercised to follow the technique of Mr. Cammidge's "C" reaction, in the most uniform manner, if knowledge of the clinical histories and other factors of the personal equation be eliminated, the end results, judged by Mr. Cammidge's own criteria, must be considered, as a means of diagnosing disease of the pancreas, as both valueless and misleading. There is no apparent clinical relationship between disease of the pancreas and any of our various types of end reaction. The end reactions are not artifacts, but rather they indicate actual metabolic variations. The relationship of these changes in metabolism to the welfare of the patient is not apparent.

REPORTS ON THERAPEUTIC PROGRESS.

EHRLICH'S PREPARATION, NO. 606.

It is very natural that the announcement of the discovery of an absolute and practically instantaneous cure of syphilis, as claimed by Ehrlich, should have aroused wide-spread interest among the general public as well as in the medical profession. Indeed, next to that of a specific for cancer, perhaps no discovery would be more welcomed by the laity than that of a cure for lues in any stage or form and an immediate cure—a cure of syphilis while you wait, as it were. As told by the Berlin correspondent of the *Medical Record* a few weeks ago, this alleged specific is an arsenical preparation — dioxydiamidoarsenobenzol, to be exact; or dimethyldioxyarsenobenzoldichlorhydrate, to be perhaps more exact. It was obtained not by accident, but after a long series of experimental and chemical operations, 605 indeed, the final successful product being therefore called 606; it is also called in honor of Ehrlich's assistant, Hata-preparation.

We need not review here the results of the early experiments with this remedy, for they are of a monotonous sameness, the preparation having already been employed in over 2000 cases with apparent improvement, if not cure, in all. Whether, when the opening chorus of approval has subsided, some unsuccessful experimenters will be found who could not make themselves heard at first, the future will show. It was stated in all the early reports that the remedy had absolutely no bad effect on the human organism. It is, of course, possible —all things are possible, even a safe aeroplane—that a substance may be so poisonous to the protozoan parasite of syphilis that it will destroy every one in the human body, yet will spare every cell and tissue of the host, but it is not probable. Atoxyl was thought at first to be innocuous to man while destructive to the trypanosome, but suddenly it was found to cause irremediable blindness, not to mention paralysis and other troubles. Two thousand men in central Europe may have as yet shown no ill effects from the remedy, but experience has taught us that the dangers of a new remedy are not always apparent at first. The dead from tuberculin bear mute witness to this fact.

Already Bohac and Sobotka, two Prague clinicians, raise a warning voice against a too complacent sense of security with regard to this remedy. They report in the *Wiener klinische Wochenschrift* of July 28 three cases out of fourteen in which "606" was used, in which more or less alarming symptoms arose. In all these there was retention of urine from vesical paralysis, lasting from twelve hours in one case to over nine days in another, and in two of these there was a trace of albumin in the urine; in all three cases there was loss of the patellar and the other usually tested reflexes; in the three there was also complete obstipation; moreover, in two rectal tenesmus was most troublesome. The authors note that these symptoms are very like those caused by atoxyl (not referring now to the blindness), a substance also containing, like the Hata-preparation, amidobenzol and arsenic groups. To this report Ehrlich telegraphed an answer published in the same journal of August 4. He does not deny the facts, but says that those to whom samples of the same make as that used by the Prague reporters were sent were unanimous in saying that they observed no such symptoms, which proves or disproves nothing.—*Medical Record*, Aug. 20, 1910.

"606."

The *British Medical Journal* of September 17, 1910, has this to say in regard to the new remedy for syphilis:

At the present moment it is difficult, if not impossible, to determine the full value of this new remedy, but certain facts are already available from the reports of nearly 3000 cases treated in various clinics by the most competent observers. From these

facts some deductions can be made. It is quite certain that the new remedy is capable of changing the clinical aspect of a case of syphilis in any of the three stages within a surprisingly short space of time and as the result of a single injection. While it yet remains to be decided by experience whether it is better to apply the drug subcutaneously, intramuscularly, or intravenously, and which is the best manner of preparing the solution for injection, it is practically certain that in the most desperate cases of syphilis, in which mercury is of no value and which otherwise tend to run a rapid course ending in death, health can, temporarily at any rate, be restored almost miraculously by a single injection of "606." Its specificity cannot be doubted, we are told by Neisser, an authority whose word will be accepted all over the world.

The question will be asked by all: "Is the cure permanent?" To this no certain reply can as yet be given. Neisser looks to the Wassermann reaction for an answer, and finds that only in 10 per cent of his cases has the positive reaction been changed into a negative. Others find that this change takes place in a considerably higher proportion. But it must be admitted that the significance of the reaction is not so certain as to make it possible to answer so vital a question on this evidence alone. If Wassermann's reaction depended on the presence of a syphilitic antibody in the serum of syphilitics, it would be reasonable to expect a persistence of this antibody after complete cure. Lange, however, tells us that we must be chary in speaking of a reaction becoming negative, and advises the practitioner to regard the change as a weakening of the positive reaction. The reaction is possibly dependent on an absorption of complement by globulin or other proteid substance thrown out of true solution. If this be so, we obviously know too little about the action of the toxic products of the virus on globulins to decide whether this could only take place as long as the virus is alive in the body.

The best results with "606" so far reported appear to follow injections into the gluteal muscles. Alt and others believe that the effect of this "depot" medication is more likely to be lasting than when the substance is thrust directly into the circulation. Investigations show that some time after the injection arsenic is to be found in the site of the injection. It is, therefore, reasonable to hope that from such a depot sufficient active substance could be absorbed effectually to sterilize the body of spirochætæ. Ehrlich has shown that the preparation acts directly on the parasites and not on normal tissue, but it has further been found clinically that under its influence syphilitic tissue is actually absorbed. The observation that an infant suffering from congenital syphilis of a very severe type can apparently be cured by taking the breast of its mother after she has received a single injection of "606" suggests not only that the drug is specific, but that it is powerfully specific.

We are inclined to believe, as experience in other cases has taught us, that we have not yet learned how toxic the preparation is. Meantime we note that among some 3000 cases treated with the remedy death has resulted in two almost moribund infants, in one young man, in two other adults whose central nervous system was much affected by disease, and in a fourth adult case. Ehrlich has from the first, however, declared that the drug must not be employed in cases of marked organic disease, especially of the central nervous system and of the cardiovascular system, and it would therefore seem, up to the present, that no risk to life is associated with its application in suitable cases. It is, however, much too early to speak definitely on this point. Another matter of importance is the possible effect of the drug on the optic nerve. This is of very special interest in view of experience in connection with other arsenic derivatives.

We must also wait for months and years before we can ascertain whether the first injection affects the virus in such a way as to render it refractory to a subsequent application should recurrence of symptoms occur. Time, too, will reveal whether re-

currences will occur frequently or not after injection with "606." In the meantime, it may be said with some confidence that Ehrlich has given us, by means of systematic scientific research, a highly valuable medicament, and has perhaps solved the problem, as far as syphilis is concerned, of intravital sterilization.

EHRLICH'S NEW ANTISYPHILITIC REMEDY.

The therapeutic action of arsenic in syphilis has long been recognized, but up to the time of the introduction of atoxyl no serious attempts appear to have been made to substitute arsenic for mercury in the treatment of this disease. The employment of atoxyl did not last long, as it was soon discovered that the toxicity of this compound was considerable and the advantages over the older mercurial preparations were not of a nature to justify the risk. Ehrlich realized, however, that arsenic would prove of great value in this field of therapeutics, and began a systematic investigation with the object of determining which compounds lent themselves best to the purpose. He aimed definitely at a *therapia sterilisans magna.* Arsazetin was brought out early, and proved itself possessed of a strong specific action. It was, however, too toxic for safe usage. Ehrlich achieved better results with his arseno-phenyl-glycin, a substance of which more may be heard in the future. After many patient experiments, during which 605 different preparations of arsenic were dealt with, Ehrlich began to investigate a substance which Bertheim had prepared chemically for him, and which had the chemical composition of a dioxy-diamido-arseno-benzol. The experiments were conducted by Ehrlich and Hata, and the substance has received besides its chemical name, those of "606," "Ehrlich-Hata," and "arsenobenzol." The latter name is incorrect, and should be reserved for the substance from which "606" is built up. The bichloride of the substance is stable, but the sodium salt which is used for injection is very much the reverse. For this reason the former is put in sealed tubes, and this should be converted into the latter by the addition of sodium hydrate just before use. The former is a yellow powder, which is soluble in methyl alcohol, hot water, etc. Since the various clinicians who have employed it have devised a large number of methods of preparing the solution for injection, we need not concern ourselves with these details at present, the more so since the substance cannot yet be bought in the market, and each investigator who wishes to use it would naturally have to study this literature after obtaining samples from Ehrlich.

Alt was the first to report on its pharmacological action. At a meeting of the Medizinische Gesellschaft in Magdeburg he read a paper in which he recounted his experience of the preparation in syphilis in such glowing terms that it was believed that his enthusiasm was due to the newness of the remedy. In a later communication he admitted that he had feared that his wonderful results might be interpreted in this manner, but in the meantime, a large number of others having obtained the same results, he boldly defied the critic to charge him with exaggeration. It would be impracticable to deal with all the communications which have appeared since Alt's first paper, nor is this now necessary, since Dr. Bresler has published a neat little booklet in which he deals with the majority of the publications up to the middle of August of this year.

After Alt had told the world that a single injection of 0.3 gramme of "606" sufficed to clear up primary, secondary, and even tertiary lesions within the course of a few days, and to convert a possible Wassermann reaction into a negative one, Iversen, in a remarkable communication, recounted how a single injection of dioxy-diamido-arseno-benzol succeeded in curing relapsing fever in 92 per cent of the cases. In three out of the four cases in which relapses took place after the injection, no spirochætæ could be found, notwithstanding diligent search. Ehrlich and his assistants had previously been able to cure relapsing fever in mice and rats by one injection. Iversen applied

the medicament both intramuscularly and intravenously, and came to the conclusion that the therapeutic dose for relapsing fever was 0.2 to 0.3 gramme. During the following months a large number of clinicians tested the action of "606" in syphilis, and with one accord sung its praises in their reports. The extraordinary rapidity with which it acted appears to have struck every one. Wechselmann stated that the curative action was so rapid that the patients could not be demonstrated with advantage. This author reported a number of cases in which the cures, or rather disappearance of symptoms, were little short of miraculous. He was especially gratified by the results obtained in malignant cases which had resisted medication with mercury and potassium iodide. Cases of bad prognosis were recorded in which the remedy, in spite of apparently approaching death, succeeded in restoring health within a few days or a week or two. Up to August of this year no adverse reports, as far as concerns the removal of symptoms, were published. The lay press in Germany and France took up the subject with enthusiasm, and "interviews" with Ehrlich, Hallopeau, and Gaucher *inter alios* were given in sensational style in *Le Journal*. Some dissatisfaction was expressed by a few that the drug was not readily obtainable, but this appears to be unjustifiable, since Ehrlich had distributed in the most open-handed manner possible sufficient quantities to the directors of clinics with a large venereal clientele. The drug is not to be placed on the market until Ehrlich has collected records of from 20,000 to 30,000 cases.

While a large number of the publications deal more or less exclusively with clinical records of the visible improvements in bad cases, a few deal with the subject in an inquiring spirit, and of these those of Neisser and Blaschko deserve special mention. It is necessary, however, briefly to state, before passing on to these papers, that Taege and Duhot independently reported cases of a syphilitic mother, with an infant badly infected with hereditary syphilis, being treated by injection, and the infant suckling at its mother's breast becoming completely freed from all signs of the disease within a very short time. Neisser was struck by the fact that only 10 per cent of the cases treated with this new remedy showed a transition from a positive to a negative Wassermann reaction, while recurrences were also observed in some cases. Neisser himself leaves it an open question whether these results may not be due to the smallness of the doses employed. Other observers (Lange, Fraenkel and Grouven, etc.) confirm the find as far as the Wassermann reaction is concerned, and Lange found that some cases which gave negative reactions before treatment became positive after injection. This was also confirmed by others. In many cases this change was transient, while in others it appeared to be more or less permanent. In spite of this, Neisser stated that there can be no doubt as to the specificity of the drug, and that he awaits further observations before deciding whether it cures absolutely or not. Blaschko came to the conclusion that while a perfect cure does not occur in all cases, and while it is not probable that a well-established constitutional syphilis could be cured right off with a single injection in the doses now employed, the prospect of a *therapia sterilisans magna* in early cases appears to be good. He laid certain indications for its use, and was hopeful that great things may be done in these cases. They include cases in which mercury has failed to cure, cases in which mercury is not well tolerated, cases in which, in spite of mercury, recurrence of symptoms occurs, and very early cases. He further believed that the medicament might be given with advantage in cases with fresh constitutional symptoms which had not yet been treated with mercury, or in combination with mercury or iodide, in recurrent cases, and also in parasyphilitic affections.

With regard to the disadvantages of the preparation but little can be said. The majority of the authors report that, with the exception of some pain and infiltration (this may be severe) at the site of injection, and occasional rise of temperature, transient

rash, and even vomiting, no ill effects result from the injections, and that, provided it is not employed in cases with advanced organic degenerations, no risk attends its use. Fraenkel and Grouven report the sudden death of a young waiter who was treated by intravenous injection of "606" in rather high concentration. At the post-mortem examination extensive cerebral disease, a flabby, atrophic heart, hypoplasia of the kidney, enlargement of the spleen, and engorgement of the liver were found, and Ehrlich is unwilling to regard this case as justifying a condemnation of the intravenous application of the remedy. Bohac and Sobotka reported three cases out of 14 which revealed serious toxic effects of the injections. These included retention of urine, disappearance of the patellar reflexes, tenesmus, and constipation. Ehrlich appears to have made inquiries of the other investigators as to the occurrence of these symptoms; but Alt, Doerr, Finger, Neisser, Michaelis, and others replied that they had not observed anything similar in all their cases. Sellei suggested that the symptoms observed were due to methyl alcohol used in dissolving the powder. This explanation was not accepted either by the authors or by Ehrlich, since only very small quantities were employed. Two infants died shortly after injection in Wechselmann's clinic, but in these cases Ehrlich suggested that, inasmuch as the death took place after all the signs of congenital syphilis had disappeared, and no evidence of arsenical poisoning could be obtained at the post-mortem examinations, the death should be ascribed to a sudden setting free of endotoxins from the killed spirochætæ, and advised that infants whose nutrition is not good should not be treated in this manner.

Wechselmann and Lange report that they have succeeded in preparing the solution in such a manner that it can be injected without pain. Lastly, mention must be made of the fact that the injections are at times followed by Herxheimer's local reaction. Neisser regarded this as evidence of the specific nature of the pharmacological action.

In conclusion reference must be made to an excellent article by Bayet, in which the whole subject, as well as his own observations, is dealt with, and also of the fact that the treatment is being tried in London both at the Lock Hospital and the London Hospital. The results in England are said to be extremely good; and McDonagh goes further than most observers in claiming that there is no doubt that "by Ehrlich's genius the greatest victory over syphilis has been gained . . . and we know that we are on the right road to find an absolute cure for a disease which is a curse to mankind." On the other hand Bouchard, in a recent communication to the Académie des Sciences, is decidedly hostile to the claims made on behalf of the new remedy.—*British Medical Journal,* Sept. 17, 1910.

THE INFLUENCE OF MUSCULAR FATIGUE AND OF ALCOHOL UPON CERTAIN OF THE NORMAL DEFENCES.

As the result of an experimental research ABBOTT and GILDERSLEEVE reach the following conclusions:

1. That the opsonizing power of the blood as determined by the opsonic index may be markedly diminished by severe muscular exercise and by the ingestion of alcohol.

2. That though the opsonic content is diminished as a result of severe muscular exercise, there is, on the other hand, a coincident temporary increase of the leucocytic content of the peripheral blood which may return to normal if exercise be continued.

3. That prolonged muscular exercise followed by the injection of pyogenic bacteria may favor pyogenic infections, but—

4. That violent muscular exercise following inoculation is more apt to result seriously than that preceding it.

5. That the ingestion of alcohol is quickly accompanied by a lowered opsonic index, but that the index as quickly returns to the normal with cessation of the alcohol. The amount of alcohol needed to bring out this

result had no influence on the resistance of the animal to infection.

6. That in the light of these experiments it is manifest that factors other than those here considered are concerned in the condition of susceptibility and immunity, in so far, at least, as they relate to infection by the pyogenic organisms.

7. That some, at least, of the failures to infect animals in these experiments may perhaps be explained through the marked temporary increase in the leucocytic content of the peripheral blood.

TREATMENT OF ACUTE NEPHRITIS.

In the *Journal of the Michigan State Medical Society* for July, 1910, BOISE writes on this subject and asks: What then are the indications for treatment in an established acute nephritis?

1. To prevent uremia.
2. To prevent anuria.
3. To prevent heart failure.

First, then, what is uremia? Nobody seems to know.

Wells defines it as "An autointoxication which affects mainly the nervous system and occurs in connection with renal insufficiency. It is due to retention in the blood, tissue, lymph, and cells of the body of certain indeterminate but specific products of perverted or normal tissue metabolism, which are not excreted by the inadequate kidneys, or are not taken up by the lymphatic radicles, or are not neutralized or destroyed by the lymphatic glands or other protective organs."

Vaughan says: "In uremia the poison results from a radical change in metabolism, and the active agent produced is not one of the normal constituents of the urine."

Crofton argues that we must look to the liver rather than the kidneys for the cause of uremia. He says: "The clinical evidence, and what may be called the pathogenetic evidence in favor of the hepatic origin of many cases of uremia, is, in my judgment, very strong and convincing."

Krehl, in a rather full discussion of the nature of uremia, says: "Not infrequently during the course of renal disease a group of symptoms develops which seems to be caused by some sort of intoxication. This is called uremia, and it presents the most varied clinical picture. The patient may become stupid or comatose, or, on the other hand, extremely irritable. He may have local or general convulsions, or he may suffer from paralysis of various parts of his body. Sometimes he becomes blind without there being present any objective lesion in the eyes. The heart's action is at first slow and irregular, but later becomes very rapid. The respirations become deeper or assume the Cheyne-Stokes type."

Again: "Beyond doubt the symptoms of uremia are caused by some sort of intoxication, and our first supposition would naturally be that this intoxication is due to the retention of substances in the body that should normally be excreted by the kidneys. Yet a number of facts speak against this view. In the first place, an absolute anuria may persist for days without producing uremic symptoms, and furthermore, even though death results from suppression of urine, the associated symptoms do not precisely coincide with those of uremia. Patients with anuria seem to pass gradually into a coma without any irritative cerebral symptoms, and the uremic rise in the blood-pressure, the slow pulse, and the characteristic convulsions are all absent. We may say, therefore, that no well-defined substance is known which will produce uremia by its retention in the body."

He also says: "It is quite possible that in nephritis toxic substances are formed in abnormally large quantities, and that they are not eliminated properly by the kidney."

"Finally," he says, "there exists the possibility that uremia is due, not merely to a failure on the part of the kidneys to eliminate poisonous substances from the body, but to pathological alteration in some of its (the kidney's) metabolic functions."

What bearing does all this have on treatment?

During nephritis (and only during nephritis) certain noxious substances are formed in the body. They are not due to

failure on the part of the kidneys to remove from the body substances normal to the urine, but they are due (probably) to faulty tissue metabolism, and possibly to faulty metabolism of the kidney tissue itself.

Therefore there are two indications: First, to eliminate through channels other than the kidney all of these noxious substances possible; and secondly, to restore the kidneys to the normal, if possible, so that thereby the faulty kidney metabolism (if such exists) may be corrected.

Elimination must be sought through the skin and bowels—through the skin by diaphoresis obtained by external stimulation. The use of pilocarpine in uremia has been generally discarded because of the excessive bronchial secretion thereby induced, which may lead to pulmonary embarrassment. Elimination through the bowels must be sought by agencies that will cause copious watery stools, such as the salines, elaterium, etc. Elaterium is to be preferred because the salines might act as irritants to the kidneys. But in proper cases the agent to be relied on above all others as an eliminant is venesection followed by transfusion or the infusion of normal salt solution.

The normal tendency of diseased tissue is toward recovery; therefore give the kidneys as much rest as possible, using only those diuretics that stimulate the secretion of the watery part of the urine, remembering that the careless use of diuretic agents may be more injurious than helpful.

In anuria the conditions are different. There may be absolute suppression of urine for days without causing uremic symptoms. Inasmuch as the results of anuria are due to retention in the body of substances normal to the urine, the indication is to restore the kidney functions as early and fully as possible. How this shall be done is the great problem in anuria.

The amount of urine secreted normally depends on the amount of blood flowing through the kidneys, and upon the rapidity of the flow. The toxins that cause the nephritis cause the suppression of urine. They do this by impairing the secretory power of the epithelium of the glomeruli and tubules, and by causing contraction of the arterioles. By this the amount of blood is lessened, and also the rapidity of its flow. If the suppression persists the epithelium of the glomeruli and tubules is irreparably injured, the blood becomes increasingly loaded with substances which should be eliminated through and by the kidneys; coma supervenes and death speedily follows.

But early in the disease, when the urine is becoming scanty, high colored, and heavy, treatment may be of benefit. The functions of the kidney may be restored and death may be averted.

But how? Not by giving large amounts of water, because, as Von Noorden says, "the kidney of anuria is as unable to secrete water as anything else, and to such a kidney water is as irritant as urea."

But since the condition of the kidneys is caused (presumably) by toxins, it is imperative that they shall be eliminated as rapidly and completely as possible, and this elimination must, of course, be sought through the skin and bowels. In anuria, where there is such intense congestion of the kidneys, the use of pilocarpine may be advisable, inasmuch as over and above its diaphoretic action we hope for a relaxation of the contracted arterioles of the kidneys, a relief of venous stasis, and a resumption of function by the kidneys. Following the efforts at elimination the very mildest watery diuretics may be given. Stimulant or irritant diuretics are to be avoided. Hot fomentations to the kidneys, persistently applied, may do good.

The author is of the opinion that when the anuria is obstinate, and the patient is sinking into a condition of coma in spite of all our efforts, we should resort to rather extensive decapsulation of one or both kidneys, hoping or expecting by this procedure to relieve the local tension, to remove the pressure on the arterioles and veins, and to reëstablish the circulation of the blood, thus enabling the glomeruli and the tubules to resume their functions.

Venesection is not to be forgotten, be-

cause it may be of value not only as a measure of elimination but as an equalizer of the circulation.

THE TREATMENT OF ARTERIAL HYPERTENSION.

In the *American Journal of the Medical Sciences* for July, 1910, ELLIOTT says that if the blood-pressure range is excessive, and especially if observations indicate the presence of vascular spasm, nitrites may be begun. The nitrite best suited for routine use is sodium nitrite. Its action is sufficiently prolonged to qualify it for this purpose, and its administration is not attended by the disagreeable cerebral discomforts that frequently follow more active vasodilators (nitroglycerin, erythrol tetranitrate). It may be begun in doses ranging from one-half to three grains at intervals of from two to six hours, depending on the severity of symptoms. It should be invariably begun in the smallest dosage and gradually increased until the effect desired is produced, or its failure demonstrated. Its therapeutic action can often be observed in the blood-pressure chart, but not always. A certain proportion of cases show a reduction of from 10 to 15 per cent in the average blood-pressure range, and along with this reduction experience a sensible relief of symptoms. Not infrequently the blood-pressure chart may show no reduction, and even at times a slight rise in average pressure. We are not to conclude from this that the drug is inoperative, for such patients occasionally will testify that their cardiac irritability, dyspnea, or cerebral discomforts have undergone a distinct amelioration. Such individuals may be considered favorable subjects for nitrite therapy. A certain proportion of patients are distinctly worse under nitrite therapy. This is almost always the case in the hypertension of Bright's disease. Nitrites often cause a marked fluctuation without reduction in the average pressures, but with the effect of markedly aggravating cardiac and cerebral distress. Such cases are unsuitable for vasodilator medication. As a general rule nitrites should not be employed in Bright's disease except to meet emergencies.

For routine use in favorable cases the following combination, originally suggested by Brunton, will be found excellent: Sodium nitrite, 2 to 3 grains; potassium nitrite, 10 grains; potassium bicarbonate, 10 grains. To be taken in hot water three times a day after meals. Spiritus ætheris nitrosi in teaspoonful doses, several times daily, will often be found sufficient to modify the discomforts of high pressure.

The employment of the iodides coincidentally with nitrite medication will at times be found to improve arterial response. In cases characterized by advanced arterial degeneration and impaired vasomotor tone iodides are indicated rather than nitrites and should be given in a routine manner for long periods.

The fact that the case is one of hypertension does not necessarily imply that we must confine our efforts to the relief of the vascular condition. It is often quite as essential to support the heart. We are frequently apprised of the existence of ventricular inadequacy, especially in long standing cases of hypertension; by the existence of edema, gallop rhythm, or the occurrence of attacks of acute dyspnea. With or without such indications to guide us it will often become advisable to resort to some method for the estimation of the heart reserve. A rough and ready clinical means for estimating the functional power of the heart is Graüpner's test. This test rests upon the fact that the work of reaction of weakened hearts after a measured amount of exertion differs from that of normal hearts. Graüpner used a weight and pulley ergometer. A measured amount of stair-climbing may be made to answer equally well. The number of foot pounds of work is reckoned by multiplying the body weight in pounds by the number of stair-steps climbed.

Graüpner describes the reaction in normal hearts (normal Erholung) as follows: After the pulse-rate has risen as the result of exertion and again fallen to normal, which happens quickly in healthy subjects, the systolic blood-pressure begins to rise,

reaching its maximum some minutes later than the pulse-rate, gradually falling thereafter to or sometimes below the original level. In weakened hearts if the damage is but slight the reaction of the blood-pressure still occurs, but is delayed and perhaps diminished in degree. In seriously weakened hearts there may be no reaction whatever, the blood-pressure declining from the start, then gradually reascending to the usual level. According to the experience of the author the usual reaction on the part of the blood-pressure is an immediate rise of from 20 to 40 mm., coincident with the increase in pulse-rate. Almost at once the pressure begins to fall again, and in from ten to twenty minutes has reached its former level. In seriously weakened hearts this primary rise of pressure is but slight, usually a few degrees only, and is almost immediately followed by a decline which progresses until the pressure may register 30 mm. or more below the original point, the pulse increasing in frequency and perhaps becoming unsteady as the blood-pressure falls. This type of reaction may be interpreted as showing the ventricle first reacting but proving unequal to the task of maintaining pressure with a compensatory increase in pulse-rate.

Although Graüpner's method is of unquestionable value in assisting us to a better demonstration of muscular insufficiency, the author's experience would lead him, he asserts, to interpret the findings secured thereby in a liberal rather than a literal manner. A negative finding has not the same value as a positive one. Quite recently he elicited a pretty satisfactory reaction from an old gentleman with hypertension, yet notwithstanding he died within a fortnight of asystole. The greatest caution should be exercised in the administration of nitrites in cases displaying indications of ventricular weakness. The effect of nitrite therapy in this type of case is often to produce rapid heart action, depression, and dyspnea. If administered at all nitrites should be given very guardedly in conjunction with cardiac tonics.

When the indications point to cardiac insufficiency the greatest emphasis should be placed on the dangers of overexertion, and cardiac tonics may be cautiously introduced. Because the case is a high-pressure one need not deter one from using digitalis, as it is rare that in physiological doses this drug increases pressure sufficiently to endanger the vessel wall. On the contrary, it is not rare to note a fall in blood-pressure under digitalis, probably because the drug by improving pulmonary circulation procures better oxygenation of the blood.

ACIDIFIED MILK IN PEDIATRIC PRACTICE.

BRADY in the *Archives of Pediatrics* for June, 1910, tells us that in hot weather the milk he uses is first boiled before being inoculated. In preparing the acidified milk the fresh milk is inoculated with the lactic acid bacillus and then allowed to ripen for twenty-four hours by standing in a warm room; it is diluted with barley water to the desired strength, and in order to raise the caloric value to the needs of the infant a tablespoonful of cane-sugar is added to the quart of the mixture. For young infants one part acidified milk, two parts barley water, a tablespoonful of cane-sugar to the quart of the mixture is ordered. Older infants receive one-half and two-thirds acidified milk with barley water; malt-sugar has also been used in place of the cane-sugar when the gain in weight was not satisfactory.

Where there was an intolerance of fat, skim milk was used. A failure to gain in weight with good digestion was met by the use of top milk. From the first the results were striking; young infants throve on this food, and he had many more successes than with the split proteids. The writer states that he remembers the time when one-half the babies in a ward would have green stools; now green stools are seldom seen.

It will be to no advantage to give a long series of case reports; suffice it to say that a large number of the babies who received this food were perfectly healthy; then again

cases of malnutrition and intestinal indigestion also received this food. The results were far superior to any which he had had at any previous time. It was especially gratifying to see the effect in cases of intestinal indigestion with large quantities of mucus in the stools, the so-called mucous disease of Eustace Smith. The stools rapidly became normal and all mucus disappeared. Infants fed on other food who showed colic were very amenable to this food. He has not ordered this food in private practice for well babies, it not being necessary. There is considerable prejudice among many mothers against this food. It certainly has anything but a palatable appearance, and the idea of giving such a sour conglomeration to a little baby is not especially appealing. Acidified milk being practically a predigested food, the stomach and bowel are required to do little or no work in its disposal. The question has frequently been raised whether or not it would be troublesome to return to a modified milk diet. He has had no trouble from this score when a little care was taken and the first formula made somewhat weak. He does not keep the infants on buttermilk indefinitely, as he believes the digestive organs will go on to better development if they are given more work. He certainly prefers, however, in summertime, to keep infants on acidified milk and have them stay well, even at the risk of having them under weight, than to feed sweet milk with the danger of gastroenteric intoxication.

Brady believes from his experience that acidified milk fills a long-felt want in the institution feeding of infants. Pure air, however, is indispensable, and the larger the ward and the fewer babies in that ward the greater the success with any method of feeding. Young infants at birth may with advantage be placed on this food. Thrush and other forms of stomatitis are seldom met with in infants receiving this food. The development of scurvy and rickets need never be feared. Acidified milk places at the disposal of the infant the casein in the form of the lactate, which is so necessary for the growth and development of the infant, in an assimilable form and in a sufficient quantity. The lactic acid bacillus and the lactic acid certainly seem to prevent the development of intestinal indigestion, as the babies on this food almost invariably have good stools. It seems that the infant when receiving acidified milk mixtures is in a better position to care for the fats, and that a larger percentage of fat may be fed than when on the usual modified milk mixtures. The casein in acidified milk being in the form of lactate is not affected by the rennin. He desires to emphasize the rarity of curds in the stools of infants receiving acidified milk mixtures even when top milk mixtures are employed. He does not by any means wish to be understood from this fact to advise the use of these high fat percentages in the early weeks, as fat diarrhea and fat intoxication must be reckoned with. From his observations it would seem that fat alone, and proteid alone, are not responsible for the curds in the stools of infants fed on cow's milk; for their production it would seem that the fats require the presence of the proteids, and that both acting together produce the very familiar curdy, mucous stool; the latter due to a secondary catarrh from the irritation of the former. This reasoning seems close at hand when it is considered what occurs in acidified milk feeding. The proteids are in the form of very fine particles, especially if the acidified milk has been well agitated, not coagulable by rennin; therefore its deleterious influence on the fats is removed, hence the normal stools.

ALCOHOL AND NEPHRITIS.

In an article based upon 460 cases HULTGEN discusses this subject in the *Journal of the American Medical Association* of July 23, 1910, and reaches these conclusions:

1. Alcohol when taken daily, as it is by chronic inebriates, dipsomaniacs, or drinkers, is not an irritant to the kidneys.

2. When nephritis occurs in a chronic alcoholic, it is probably due to some other

concomitant toxic agent, and not to alcohol.

3. Overeating, acute intoxicants, exposure to cold, autointoxications, infections either manifest or latent, and some metabolic disorders as yet unknown, are the real causative factors of nephritis.

4. Alcohol when taken by drinkers as food or stimulant, such as we see in chronic alcoholism, is a diuretic.

5. Those tissues which eliminate alcohol are least affected by it. This applies to the lungs and especially to the kidneys.

6. Alcohol, while an intoxicant, is also a detoxicant, ridding the body of various deleterious catabolic products.

THE TREATMENT OF INDIGESTION.

SPRIGGS in the *Clinical Journal* of June 22, 1910, tells us that the majority of those who seek advice do not present well-defined series of signs, but complain of one or more of the symptoms known as "dyspeptic." A consideration of the results obtained from the many examinations of the gastric contents that have now been made shows us that we cannot diagnose with certainty from those symptoms whether there is a chronic inflammatory condition of the stomach or not, and whether the secretions are altered or absent. We may classify the cases from the symptoms to our hearts' content, but though we may often be right, we shall often be wrong. Nevertheless, a great number of these patients can be cured without using a tube, even when no vomited matter is available, by applying the results of past experience, and that being so, if a patient has not been treated, it is the writer's opinion that the simple means we all know of should first be used. He prefers very much to make an accurate diagnosis, especially when it can be done by so easy a procedure as a test meal; but that does not justify him in passing a tube in every case of dyspepsia, he asserts, when he knows that there is a good probability of relieving the malady without that operation.

Of 425 cases of dyspepsia under his care of which he had taken notes, 61 were well-marked cases of hypersecretion, dilatation, alcoholism, or the dyspepsia of young children. The remaining 364 complained of pain or discomfort shortly after food, with such symptoms as the following: Burning and smarting in the stomach and back, in many cases worse on exertion, or in cold weather; distention; sinking, faintness, a feeling of emptiness, specks before the eyes; palpitation, choking in the throat, dyspnea; spasms, flatulence, eructations, pyrosis, retching, vomiting of "phlegm" or food; loss of appetite; tiredness; constipation, diarrhea.

The author has looked through the treatment given to all these patients and finds that the majority of them were successfully treated by advice as to habits, particularly with reference to rest, alcohol, and tobacco, as to diet, and by certain simple medicines. In order to draw up rules of diet the daily food of the patient must be inquired into. Pastry, potatoes, greens, new bread, alcohol, and tea should be avoided, and fluid taken at the end of a meal, or in severe cases an hour before the meal. On looking through the many medicines used, he finds that by far the most useful were alkalies, carminatives, bismuth, and bitters. Sodium bicarbonate is given an hour to an hour and a half after a meal, or when pain and discomfort comes on. It arrests the continuous weak secretion in gastric catarrh, as Pawlow showed, thus sparing the glands to produce a better fluid at the next meal; it helps to dissolve the slimy material produced by the mucous glands; and it neutralizes acid if that be present in excess. A carminative in the medicine stimulates the stomach to discharge the air swallowed in nausea and any gas formed in the stomach, and increases the blood-supply of the stomach wall. The following is the most generally useful prescription of those the author has given: Bicarbonate of soda, 25 grains; tincture of ginger, 30 drops; chloroform water, 1 ounce. Bismuth is also very valuable, especially when hyperesthesia is present; it is usually given before meals and in good quantity, half a drachm at least of the

carbonate or oxychloride, as a powder, or shaken up in water with no mucilage. If the bismuth is suspended by mucilage in the water, it will be so in the stomach. The liquor bismuthi et ammonii citratis, which throws down its bismuth when exposed to the acid reaction of the stomach, embodies a good idea, but there is nothing like enough bismuth in it—only about three grains in each drachm. If the appetite is poor and the juices are regarded as deficient, then bitters are given before meals in acid solution.

These time-honored measures, and others like them, are, as the author has said, successful in the majority of ordinary cases. There remains, however, a large number of cases which do not yield in a trial extending over two or three weeks or longer. If an accurate diagnosis has not been made from vomited matter, the patient should then be given a meal of three or four ounces of bread and half a pint of weak tea in the morning and some of his stomach contents obtained by the tube an hour or so later. If a large amount of mucus is present and is not derived from the saliva (which contains small bubbles) he is the subject of gastric catarrh. If microscopical examination shows glandular cells and leucocytes in excess, then chronic inflammation is present, whether there be an excess of mucus or not. In chronic gastric catarrh the percentage of hydrochloric acid may be increased, normal, or diminished, or the acid may be absent. If it is diminished in quantity or absent the ferments are usually deficient too.

The treatment of chronic gastric catarrh will be guided by the results of the examination. The evidence of subacute inflammation of the mucous membrane indicates that fluid food should be given, unless there is excellent masticatory power, in which case a little solid food may be allowed. The bulk of the dietary must, however, consist of milk with cream, butter and eggs. Very hot and very cold food and drinks must be avoided. If the hydrochloric acid is in normal proportion or in excess, protein may be ordered more freely, such as eggs, tender chicken or mutton, and fish. If the acid is diminished or absent flavored foods and soups may be given to arouse a secretion, but, of course, no peppers or irritating spices. Meats must be minced or very tender, as connective tissues will be badly digested in the absence of efficient gastric juice. The stomach must not be exposed to the irritation of metallic or vegetable purgatives, or of magnesium sulphate. Water may be taken fasting for constipation, and enemas should be used if required. If the amount of mucus is excessive and remains so in spite of treatment, the stomach may be washed out daily for a time with a weak alkaline solution.

If there is no excess of mucus in the material obtained and microscopical evidence of inflammatory exudation is wanting, whilst the acid is absent or diminished and the test meal undigested, the condition is one of simple deficiency of secretion. Spicy foods should be ordered to be taken chopped up small or semifluid at first, but not much meat or protein. The administration of ferments and even of gastric juice itself has not justified the hopes which were at one time aroused. A medicine containing hydrochloric acid may be given, with iron if needed, and general "tonic" treatment. A stay at a spa is often beneficial, with hydrotherapy, especially in cases with a large neurasthenic element.

The treatment of hypersecretion has already been outlined.

If motor deficiency is suspected, the stomach should be washed out three or four hours after the test meal, or better, a test supper of bread, meat, and water or cocoa given at night, and the stomach washed out in the morning. If there is any residue in the stomach the diagnosis is confirmed; it may also be made by repeated *x*-ray examinations after a meal of bread and milk or porridge mixed with bismuth carbonate or oxychloride.

Weakness of the abdominal walls must then be treated by exercises and massage, with the use of a belt or binder for a time when in the upright position. The meals

should be small, and restricted to two to three pints a day. Strychnine, and, if necessary, iron, may be given. The character of the food ordered will be determined by the amount of hydrochloric acid and the presence or absence of ferments upon the lines already detailed.

If the material obtained from the stomach is of a sour smell, and consists in part of the food of earlier meals, and contains sarcinæ and yeast cells, then actual stagnation of food has taken place. Such a condition is, as above mentioned, enormously relieved by washing out the stomach, with the dietetic measures referred to in the last paragraph, and the use of sulphocarbolate of soda or salicylic acid. If the urine is scanty, fluid may be given per rectum. But, except in certain uncommon circumstances, the stagnation of food in a dilated stomach is due to gross obstruction and should be treated surgically.

CHLORETONE AS A LOCAL SEDATIVE TO THE RESPIRATORY TRACT.

In *Therapeutic Notes* for July, 1910, ANDERSON states that over a year ago his attention was called to a unique method of applying chloretone to the mucous membrane of the throat. In *La Presse Médicale*, July 20, 1907, Fiocre describes it. He takes advantage of the volatile property of chloretone. By the application of heat the crystals become readily liquefied and the vapor can be deposited upon a surface by a current of air. He suggests a simple apparatus for its use in this way. All that is necessary is a glass tube, with a spherical bulb at about the center of the tube. About ten grains of chloretone are placed in the bulb, the opening in the top is closed by a cork, and heat applied until the crystals melt. An alcohol lamp, an ordinary gas flame, or even a lighted match will supply the necessary heat. While the crystals are in the liquid state a current of air is drawn through the glass tube, and a white vapor of pure chloretone can be deposited upon a surface. Air from a compressed-air apparatus or from an ordinary atomized bulb furnishes the current necessary. As the tube cools, the chloretone will be deposited on the inner surface of the glass. By heating the tube the deposit can be melted and run back into the bulb, and used again.

Vapor of chloretone deposited upon a surface of mucous membrane forms a white film. Gradually it becomes dissolved by the moisture on the surface of the membrane. At first there is a slight tingling, and a suggestion of the taste of camphor, which is soon followed by its anesthetic action.

Chloretone applied in this way to a tubercular larynx will produce in a few minutes an anesthetic effect sufficient to enable a patient to swallow soft food without discomfort. This effect often lasts for hours, and can be repeated several times a day, if necessary. In a similar manner the writer has used chloretone to relieve the pain following operations upon the throat, and in malignant diseases. Like all similar drugs its effects will wear out in time, but it can be used in increasing frequency without danger of establishing a drug habit or fear of poisonous effects. Its marked germicidal action adds to its value when used locally.

THE TREATMENT OF SYPHILIS WITH "606."

IVERSEN (*Münchener medicinische Wochenschrift*, Jahrg. 57, Nr. 33) injects the preparation intravenously because this method is painless and produces rapid and very extraordinary results. To the dose of "606" in clear solution 250 Cc. of sterile physiological salt solution is added, and this injected into the cubital vein by means of a sterile graduated bottle to one side of which a needle is attached and to the other a rubber bulb for making air pressure in the bottle. This method is very simple and permits of careful graduation of the dose. The author has found that a large dose, not less than 0.6 g., is essential to good results. The injection of large doses into the muscles is attended with great difficulty on account of pain and the marked reaction. After intravenous injection the arsenic has

all been eliminated from the body within four days, whereas after intramuscular injection at least fourteen days are required for elimination. It seems desirable that the substance should be kept in the tissues to exert its action upon the spirochætæ as long as possible. In order to accomplish this the author has in some cases given intravenously 0.4 to 0.5 g., and 48 hours later has injected into the muscle 0.3 to 0.4 g. By this method there is at once obtained an energetic action, and later a slower and more prolonged action from the intramuscular injection; also the local reaction from the intramuscular injection is not so great as when a larger dose is given in this manner. Furthermore, by this combined method it is easy to introduce 0.75 to 0.8 g. into the system. In several instances in which the patient was not able to leave his work for more than a day, the injection was made subcutaneously under the shoulder-blade. This is more painful than the intramuscular method, but is not so disabling in those of sedentary occupation. The pain radiates down the arm or leg, and in nervous persons sleep is impossible without a narcotic for two or three nights.

After intravenous injection there usually occurs in two or three hours a chill lasting about half an hour, followed by rise of temperature and joint pains; in some cases there occur vomiting and liquid stools. No arsenic is found in the vomitus. On the following day the patient feels well but is weak. In four cases in which on account of an insufficient dose (0.36 to 0.4) the syphilitic symptoms had not quite disappeared a second injection of 0.4 g. was given. This was well borne and gave no untoward symptoms. Previous mercurial and iodide treatment does not offer any hindrance to the treatment with "606." After treatment with this preparation the general condition of the patient is plainly improved; most patients have a good appetite and take on weight. The rapidity with which the syphilitic manifestations disappear depends upon the pathological character of the lesions. Superficial erosions, roseola, plaques, and specific sore throat disappear in a few days, while the papular and pustular lesions require ten to fourteen days. Moist papules become dry in a few days, but a longer time is required for their complete disappearance. Vegetative lesions about the anus recede rapidly, although the author has had two badly neglected cases in which they have not disappeared at the end of three weeks. On account of their anatomical structure the longest time is required to get rid of the primary sore and the adenitis. Ulcerative processes and gummata show beautiful results, as does also hereditary syphilis. In one patient who had suffered for ten years with a syphilitic ulcer of the forearm which had resisted mixed treatment a cure was obtained in three weeks.

Von P. Ehrlich (*Münchener medicinische Wochenschrift*, Jahrg. 57, Nr. 35) refers to the case of Fränkel and Grouven in which death followed the intravenous injection of "606." He also mentions the numerous pathological findings in their case at autopsy, including among others softening of the left temporal and parietal cerebral lobes, internal hydrocephalus, chronic leptomeningitis, flaccid heart muscle with atrophy, and adipositas cordis. He quotes the statement of these observers to the effect that they have in their further use of "606" avoided its intravenous injection, and that they believe the majority of physicians will avoid intravenous injections. Ehrlich expresses the opinion that it was not the intravenous injection of the preparation but the preëxisting poor condition of the patient which should be blamed for the lethal effect in this case. He states that he had early called attention to the danger of injecting large doses in patients suffering from very advanced degenerative processes in the central nervous system. In two similar cases death followed subcutaneous and intramuscular injection. He does not consider the authors correct in their general condemnation of intravenous injection, for this method has been used in about 300 cases without bad effects. In several cases as high as 1.0 g. has been given intravenously with only temporary symptoms due to the

injection. In patients suffering from brain disease, arteriosclerosis, severe functional heart disturbances, especially angina pectoris, the intravenous dose should not be over 0.3 to 0.5 g. In one case of extremely severe tertiary syphilis with extreme emaciation there was given intravenously without bad result 0.45 g. In this instance the edema was so great as to make subcutaneous injection impracticable.

SPIETHOFF (*Münchener medicinische Wochenschrift*, Jahrg. 57, Nr. 35) states that, even if the time of observation of cases of syphilis treated with the larger doses of "606" has not been long enough to enable one to speak of definite cure, experience so far has taught that every syphilitic should be subjected to this new form of treatment. The experience of the author based upon 50 cases has been entirely favorable. Since May 13 he has treated 6 cases of primary, 16 of secondary, 12 of latent secondary, and 10 of tertiary syphilis; 1 case of hereditary syphilis, 3 cases of tabes, and 1 of pernicious anemia and severe secondary syphilitic anemia.

The injections were always intramuscular, in the form of solution or in the form of the emulsion of Michaelis. In six cases the dose was 0.3 g., in two 0.45 g., in four 0.5 g., and in twenty-six 0.6 g. The influence upon the specific manifestations of the disease was often noticeable twenty-four hours after the injection. The primary lesion was often completely epithelialized in one to three weeks. Phimosis dependent upon a primary lesion disappeared inside of six days after a dose of 0.6 g. Condylomata disappeared from the genitals in ten days after a dose of 0.3 g. and more quickly after 0.6 g. Mucous patches upon the mucous membranes subsided in two to three days after a dose of 0.6 g. In a case of syphilis of the nose the purulent secretion ceased in twenty-four hours. In two days breathing was free through the nasal fossæ, and in three days the ulceration was healing and very little infiltration remained. This occurred without any local treatment. The case of hereditary syphilis was a two-month-old, very poorly nourished child with wide-spread papulopustular syphilides, infiltration of the lips, coryza, and osteochondritis of the humerus. The dose given was 0.02 g. injected intramuscularly. In three days there was plainly a subsidence of the exanthem and of the infiltration of the lips; after seven days the arm, which had been helpless, was somewhat movable, and in five days more it had entirely free and painless passive and active movements; in twelve days the exanthem had entirely disappeared and there was only slight coryza. The child recovered and attained a good state of nutrition.

The influence upon the Wassermann reaction was observed in 15 cases. In a case of primary lues the Wassermann reaction became negative in four weeks; in the remaining cases it was negative within six weeks, except one, in which it was weakly positive after ten weeks, the dosage being 0.45 g. In one case of secondary lues the Wassermann became negative in eight weeks after a dose of 0.3 g.; in 2 cases it was negative after 0.3 g. in six to seven weeks.

The subjective and objective symptoms produced by the injection vary greatly in different patients. The phenomena of the reaction may be divided into early and late symptoms. Often within an hour after injection there is a stormy crisis. In a typical case one hour after injection there was nausea, vomiting, and profuse sweating, accompanied by palpitation of the heart. This lasted about four hours and ended with a marked rise in temperature. In one case a confluent exudative exanthem appeared on the extensor surfaces of the forearm; a few hours later it appeared upon the extensor surfaces of the thighs; in both cases this rash was superimposed upon the roseola. At the same time there appeared pain and swelling in the wrist-joints. The exanthem together with the swelling of the wrist-joints bore a close resemblance to erythema exudatum multiforme. The erythema disappeared in twenty-four hours. In a case of latent secondary lues an epileptiform attack followed four hours after the injection. In a case of tabes there occurred

blindness fifty hours after the injection, this lasting about a minute. Methyl alcohol had been used in this case in making the solution. As a rule in twelve hours after injection there occurs an increase in the white blood-corpuscles.

In the case of an extremely emaciated, anemic female of twenty-eight years, suffering from tertiary syphilis of the throat, death occurred seven hours after injection of 0.5 g. Following this experience the author has not given a large dose to a cachectic individual.

Isaac (*Berliner klinische Wochenschrift*, Jahrg. 47, Nr. 33), of Lassar's clinic in Berlin, states that he began the use of Ehrlich's preparation soon after the first announcements in reference to it. He has selected his cases very carefully, avoiding those mild ones in which the symptoms are apt to recede even without treatment, and choosing only those in which the old form of treatment had either failed or had had some harmful influence, and especially those cases which in spite of persistent treatment recurred or assumed grotesque forms. Of such cases 27 were treated and at the same time kept under close observation. The effects upon the spirochætæ as well as upon the lesions themselves were incomparably prompt. In one case, that of a girl aged twenty years, the result was especially gratifying. This patient was suffering severely with, besides other lesions, ulceration of the throat, was greatly emaciated, and had been unable to speak or eat for a week. Very energetic treatment had been carried out with mercury, iodide, and other substances for about six months without results, and the case seemed entirely hopeless. An injection of 0.4 g. of "606" was given. The next day the difficulty in swallowing was greatly relieved, and in a few days the voice was normal. In fourteen days the patient was discharged cured. There is no doubt that in this case this treatment was life-saving. In all but two cases the treatment was well borne, and the general condition was but little influenced by the injection. Attention is, however, called to the fact that certain dangers reside in the use of "606" in patients suffering from certain other diseases, as severe disturbances of the nervous system. As the presence of the material has a bad effect when injected in the neighborhood of a nerve trunk the author has used it only in the gluteus muscle. By the intravenous injection high fever has been produced. Various observers are agreed that healing is slower after intravenous injection, because the arsenic is too quickly eliminated, while by the intramuscular method the action is more gradual. The progress may be slow at first but later become very rapid, so that severe cases are cured within ten to fourteen days. The pain produced by the injection is an individual matter depending upon the nervous state of the patient; some complain a great deal, others very little. Bad by-effects noticed were fever, severe pain, swelling of the gluteal muscles, and urticarial rash.

After many experiments the method of injection determined upon by the author is as follows:

The contents of the glass vial is emptied into a dry, thick-walled glass beaker and therein reduced to a powder. To this is added a few drops of methyl alcohol and the mixture stirred a few minutes with a glass rod; then 5 to 10 Cc. of hot sterile water is added. After stirring a short time a clear yellow solution is obtained. It is necessary to neutralize this acid solution, for which purpose 1 or 2 drops of phenolphthalein are added as indicator and 0.1 per cent sodium hydrate solution added drop by drop, stirring meanwhile, so long as a canary yellow color persists, then sodium hydrate is added further until a milk and coffee color is obtained. Several drops of acetic acid added render the solution again yellow. In this way one obtains a solution of about 25 to 30 Cc. By the addition of cocaine, eusemin, alypin, or morphine solution the after-pain of the injection can be lessened. For injection a Record syringe with a large platinum needle is best, the needle being sterilized by heating in a flame. The place of injection is the outer, upper quadrant of the gluteal

region. As regards the dosage, the author has obtained as good results with 0.3 g. as with 0.4 to 0.6. Although it is too short a time since the use of "606" was begun to speak definitely in reference to the matter of recurrence, in none of the author's cases has there been a return of symptoms. The patient must remain in the hospital or under the doctor's care until the by-effects of the injection have subsided. The author believes that the time is not yet ripe for putting the remedy into the drug stores and into the hands of practicing physicians, for there are as yet too many things to be determined in regard to the dosage, the solution, the method of injection and stability of the preparation.

The Wassermann reaction plays an important rôle in determining the value of the preparation. In the author's cases only one gave a negative Wassermann reaction at the end of six weeks after injection. It would be a mistake, however, to suppose that, although the lesions have disappeared, because of the positive reaction the patient had not been cured. The fact that the spirochæta disappears at once after the injection, and that therefore the cause of the disease is eliminated, is sufficient to justify the treatment. Whether the patient thus treated will remain free from syphilis or such after-effects as tabes and paralysis will require at least a decade to determine.

MICHAELIS (*Berliner klinische Wochenschrift,* Jahrg. 47, Nr. 33) says that formerly the subcutaneous injection of the Ehrlich-Hata preparation ("606") for the cure of syphilis was feared because of the severe local disturbance produced by it. Because of this fact the author began to study the methods of subcutaneous injection. At first he injected part of the dose intramuscularly and part subcutaneously; after this he ventured to inject the full dose of 0.6 g. subcutaneously. The injection was without exception well borne. Often there was severe pain several hours after injection, but this soon subsided after hot-water applications. The chief advantage of the subcutaneous injection is that by it is avoided the great hindrance to walking and sitting that is experienced after the gluteal injection. The action is also quicker after the subcutaneous injection. The author's technique is as follows:

A wide sterile 50-Cc. graduate is half filled with water which has recently been boiled and is still hot. Into this is placed 0.6 g. of the preparation, which is dissolved by stirring; to this is added 6 Cc. of normal (not decinormal) sodium hydrate solution, and stirring kept up until the precipitate has all been dissolved. Then 3 drops of one-half-per-cent alcoholic solution of phenolphthalein are added, and normal acetic acid solution is added until a neutral reaction is obtained. In this way is produced a neutral suspension which has a bright-yellow color. Then in order to reduce the acidity normal sodium hydrate solution is added drop by drop until a slightly red color is developed. This is put into a sterile dish and injected subcutaneously. The patient sits erect and the injection is made between the shoulder-blades. After all has been injected the area is massaged in order to spread the injection over so great an area that no swelling is visible. Then a moist dressing is applied and the patient put to bed.

TAEGE (*Münchener medicinische Wochenschrift,* Jahrg. 57, Nr. 53) reports the case of a suckling child cured of syphilis through the treatment of its mother, who was nursing it, by means of "606." The mother, nineteen years old, entered the hospital in the advanced stage of pregnancy in May, 1910. The time of her infection was unknown. There was present on the genitals a large condyloma in which were numerous spirochætæ. The Wassermann reaction was strongly positive. As the development of the mammæ indicated that the mother would be able to nurse, and as the movement of the fetus betokened the birth of a living child, treatment by "606" was withheld until the child should be born in order to test the effect upon the syphilitic child of treatment of the nursing mother. The child was born on July 4; on July 12 it weighed 2400 g. It was fully developed, but was pale, shriveled, and senile; it did not cry, was apathetic, and would not take

the breast. On July 13 there appeared four pemphigoid vesicles on the sole of the left foot and one on the right; three fingers of the right hand and one on the left showed paronychia syphilitica. On July 14 0.3 g. of "606" in clear aqueous solution was injected into each gluteal muscle of the mother. After the third day there was marked recession of the condyloma and disappearance of the spirochætæ. On the tenth day the Wassermann test was still positive. On the first and second days after injection the lesions on the child progressed, but on the third day they came to a standstill, and then suddenly they all receded. On the fifth day after injection the child had a normal color; the paronychia and the pemphigus had disappeared. The child did not fret, cried lustily, and nursed freely.

DUHOT (*Münchener medicinische Wochenschrift,* Jahrg. 57, Nr. 35) says that amongst the 85 cases which he has treated with Ehrlich's new preparation with the best results he desires to report one case because of the entirely unexpected effect. Although numerous observations have shown the undoubted specificity of arsenobenzol against the spirochæta pallida and all the manifestations of syphilis, it had not previously been shown what effect the treatment of the mother with this substance would have upon the suckling afflicted with hereditary lues. In the case of the author a woman of twenty-two years who had been infected by her husband after marriage was treated in 1908 for generalized roseola. On July 4, 1910, after prolonged treatment by the ordinary methods for malignant tertiary syphilis the patient gave birth to a child showing marked evidences of hereditary syphilis. On July 25 the mother received an injection of 0.5 g. and on the 26th 0.45 g. of arsenobenzol. The effect upon the mother was wonderful. On the third day there was also noticed a marked improvement in the child's condition. The lesions rapidly improved, and during the first week there was a gain of 500 g. in its weight, and in three weeks it had gained 1200 g. In a short time an infant which seemed destined to die was converted into a blooming child. No arsenic could be demonstrated in the mother's milk. When the case was related to Professor Ehrlich he remarked that he had heard of a similar one reported by Taege.

BLASCHKO (*Berliner klinische Wochenschrift,* Jahrg. 47, Nr. 35) states that inasmuch as both the laity and physicians have some misconceptions in reference to the new treatment for syphilis, he would call attention to the fact that the problem which it brings up is not fully solved, but that Ehrlich's discovery has brought up for solution a number of important questions.

On account of the difficulty of producing the solution with exactness and absolute asepsis its preparation by neither the apothecary nor the practicing physician is feasible, it being necessary that this should be carried out in the hospital. Ehrlich recommends that the solution be injected immediately after it has been prepared, because animal experiments have shown that the preparation undergoes changes on long standing. The author's experience, however, is that letting it stand a few hours does no harm. Perhaps the suspension might be prepared in an aseptic manner and placed in sterilized tubes, and in that way kept for an unlimited time so that it might be handled by the apothecary and the practicing physician.

The subcutaneous and the intramuscular injection are to be preferred. The intravenous injection is not without danger because it cannot be carried out without the use of methyl alcohol as a solvent, and further it appears that when given intravenously the substance is eliminated too quickly. The author has experimented by giving the preparation per rectum, and following this has found arsenic in the urine, but in such small quantities as to indicate that very little of the material was absorbed. Also the therapeutic results are not good. The influence upon the disease was still less when the material was given by the mouth. In several cases the author gave a slightly acid solution diluted to 150 Cc. and warmed as a drink, which was well borne, but had very little therapeutic

effect. Ehrlich recommends an average dose of 0.5 gramme for each 60 kilogrammes of body weight. Most patients bear this dose well, but individual differences must be reckoned with. The manner in which the preparation exerts its influence is purely theoretical. Ehrlich believes that, although the influence upon the tissues is relatively small, it has a powerful influence upon the parasites. This theory is rendered plausible by the effect upon other spirilli as well as by the fact that following its use the spirochætæ rapidly disappear. It is also possible that, inasmuch as arsenic also causes the rapid disappearance of psoriasis and lichen simplex, it may have a special selective influence on diseased tissues.

The important question is whether the material, once injected, produces definite cure of syphilis. It has been observed in many cases that syphilis after treatment with mercury seems to be cured, yet ten, twenty, thirty, or forty years later the disease again suddenly manifests itself. In numerous other cases tabes or paralysis develops as a result of the syphilitic infection. It will require at least ten years and the observation of a large number of cases to answer this question.

The positive indications for the use of the preparation are cases of severe syphilis, especially those in which mercury has failed; cases of syphilis in any period in which mercury is not tolerated; cases in which shortly after the close of mercurial treatment recurrence takes place; cases in which in spite of repeated mercurial treatment recurrence regularly occurs; cases of early syphilis during the primary stage before the appearance of the exanthem, combined in these cases with excision or cauterization of the primary lesion in an effort to abort the disease. The author does not consider it proper to apply this treatment to a syphilitic during a latent period for the present at least while it is under trial. Its use should now be confined to those cases in which there is opportunity to watch its effect upon objective symptoms. There is danger that by careless use this new treatment may be discredited.

WASSERMANN REACTION.

EHRENFEST (*Interstate Medical Journal*, September, 1910) in a review of recent literature on this subject notes that a recognition of the importance of the Wassermann reaction in the work of every physician is properly attested by the fact that recently the serological laboratory of the dermatological clinic of Professor Finger in Vienna has been thrown open to all hospitals and physicians. The examinations have to be made free of charge for all poor patients, while a charge of four dollars is made for those who can afford to pay. Similar institutions are now existing in Berlin, Breslau, and other cities. The wisdom of such an order is obvious if we realize the frequency of syphilis from such investigations as, *e.g.*, have been made by Dreyer and Meriowsky on 100 prostitutes. They show that practically all of them acquire a syphilitic infection within the first three years. Of these 100 prostitutes many gave a distinct history of infection, while only one showed manifest lesions at the time of examination. Among the 43 remaining, who gave neither history nor clinical evidence of syphilis, no less than 32 gave a positive serum reaction, while 45 of the 55 women known to be infected reacted positively. Although only a comparatively small proportion of prostitutes show manifest syphilitic lesions at examinations, yet in reality from 83 to 89 per cent are, or have been, infected.

Attention may be called in this connection to the well-known fact that a certain percentage of patients, infected beyond doubt, will give a negative reaction. It is generally known that this is the case, especially after a course of specific treatment. Also in infants the reaction may at first be negative in spite of the presence of unmistakable symptoms of a congenital lues, the positive reaction becoming manifest only later.

As to the question of the transmission of syphilis from mother to child and the problem of immunization of the mother by a syphilitic child, BAUER (*Wien. klin. Woch.*, 1908, No. 36) was the first to demonstrate that mothers, apparently immunized, accord-

ing to the law of Colles, actually are latent syphilitic patients. He had found a positive seroreaction in every mother of a congenital luetic child. Identical results have been obtained by Ledermann and others. Opitz argued that the substances leading to a positive reaction in the mother may have been transmitted to her from the fetus, these same substances possibly also transmitting immunization. The answer to this argument lies in the proper interpretation of positive Wassermann reaction. Such authorities as Neisser, Bruck, and Lesser state that the positive reaction must be considered conclusive evidence that syphilitic virus is present in an active state. Nevertheless, it has been observed that men reacting positively have married without any apparent detriment, either to their wives or children. Thus it must be concluded that the Wassermann reaction may show also a latent state of infection which is not necessarily transmitted to the offspring, at least not from the father. All recent writers, however, seem to agree on the fact that the assumed immunized mother actually is a latent syphilitic and menaces her offspring. Baisch examined the mothers of 72 luetic children. In 63 the reaction was positive, in 9 negative. Out of these 63 mothers only 21 had distinct symptoms of infection, while in the other 42 such were absent. They seemed perfectly well and had no knowledge of a syphilitic infection. As has been stated, 9 mothers of luetic children gave a negative reaction. All the fathers of these children who were examined, however, gave a positive reaction. Baisch emphasizes the fact that experience shows that the Wassermann reaction does fail in approximately 10 per cent of cases exhibiting unmistakable symptoms of a florid syphilitic infection. Reinhart also comes to the conclusion that apparently healthy mothers of syphilitic children are not immunized but in a state of latent syphilis. In the opinion of Bering serodiagnosis has annulled the laws of Colles and Profeta. Mothers who have given birth to syphilitic children are not immunized but have latent syphilis. Children born of syphilitic mothers are not immunized, according to the law of Profeta, but are either syphilitic or healthy. Similar views are expressed by Knoepfalmacher.

Reference has been made to the fact that in the opinion of the most experienced investigators a positive reaction means an active state of syphilis. On the other hand, it has been argued that during pregnancy those antibodies, which make the reaction positive, may pass through the placenta either from fetus to mother or *vice versa*, and that these substances may possibly possess immunizing qualities, thus leading to positive reaction and immunization at the same time. This argument has been eliminated from this controversy by the very important work of Baisch. He combined in his investigations the Wassermann test, made both in mother and child, with microscopic search for the spirochæta. He realized the weight of the argument that a woman pregnant with a syphilitic child may give a positive reaction as the result of the presence in her blood of certain antibodies which either may have been transmitted directly from the fetal blood, or may have been formed by the mother in reaction to certain soluble toxins absorbed from the fetus. Baisch succeeded in proving that the substance inhibiting hemolysis does not pass through the placenta in either direction. He feels positive that this substance is formed only by an organism which is actually infected with spirochætæ.

Another seemingly convincing proof of the fallacy of Colles's law has been advanced by Englemann, who reports the following interesting clinical observation: A woman married to a syphilitic man gave birth to several syphilitic children without herself ever exhibiting any clinical symptoms of the infection. In a second marriage to a perfectly healthy man she gave birth to a child with manifestations of hereditary syphilis. Wassermann reaction in the second husband was negative. This case then would prove the transmission of syphilis from an apparently healthy mother, presumably immunized, to the child of a second healthy husband—a proof positive

of the fact that she was syphilitic. Bab, in discussing this case of Englemann, calls attention to the fact that similar observations have been described and quoted from literature by Matzenauer, who, long before the appearance of the work of Wassermann, had vigorously defended his idea that there is no direct paternal infection and that the so-called immunized mother in reality is latent syphilitic. The investigations of Frankel, quite recently published in an exhaustive paper which reviews the literature on the subject, force him to the conclusion that a mother who gives a positive reaction must be considered a carrier of spirochætæ.

The semen of luetic individuals may contain spirochætæ. This fact seems positively established by Finger's experiments on monkeys. Trinchese explains that the transmission of the spirochæta directly to the embryo could occur only in two ways: the spirochæta may be embedded in the head of the fertilizing spermatozoön, or may enter the ovum at the time of beginning segmentation. He considers both of these ways impossible. The spirochæta is larger than the head of the spermatozoön and, it must be assumed, would destroy the latter in its attempt to enter it. On the other hand, it could hardly be assumed that a large spirochæta could lodge itself between the first forming blastomeres without either interfering with the further progress of normal segmentation or destroying the whole ovum. He believes that the spirochætæ reach the endometrium with the semen, and that their pronounced longevity and motility enable them to enter deeply into the tissue. Thus they reach the maternal blood, causing a true syphilitic infection of the mother. In spite of all these arguments and observations both Bab and Frankel still admit the theoretical possibility of an immunization of the mother without infection in certain though rare instances.

Of far-reaching importance are the investigations made by many authors concerning the relation of maceration of the fetus to a syphilitic infection of the mother. Baisch examined 100 infants, 95 of which were macerated, while the other 5 bore distinct signs of a luetic infection. Eighty per cent of the macerated feti contained spirochætæ; in 10 per cent they could not be detected; in the other 10 per cent maceration had progressed to such a degree that there was practically no chance to detect them. One-half of the mothers gave a positive Wassermann reaction. It can be concluded that from 85 to 90 per cent of all macerated feti are luetic. In 30 instances both parents were examined. In 12 of them both showed a positive reaction. They had procreated 30 children, of whom but two were alive. Of these two, one was born alive after a thorough mercury treatment of the father, the other after an antisyphilitic treatment of the mother during the course of pregnancy. For all these cases at least the law of Profeta is not applicable. The law of Profeta usually is quoted incorrectly. He has claimed that this assumed acquired immunity is not permanent but only temporary, and in this form the law is not in absolute conflict with our present knowledge, since children born of syphilitic mothers, and who are undoubtedly syphilitic, at first may give a negative reaction.

A most important practical result was obtained in the serological examination of wet-nurses. Opitz from the first has pointed out the absolute necessity of subjecting every woman to the serum test before she can safely be engaged as wet-nurse. Bergmann ascertained that of 75 wet-nurses, apparently perfectly healthy, 7 gave a positive reaction. In 4 children of these women distinct symptoms of syphilis were present. In 17 children manifesting signs of lues he found without exception the reaction positive. He also occasionally met with a positive reaction in children in the absence of any other symptom of syphilis. In other children the reaction, while at first negative, was later found positive. Bergmann suggests as an explanation for such observations the possibility of an infection acquired during the process of labor. As the immediate result of a paper read before the Medical Society of

Vienna by Sperk and Pollak, a movement has been started in the medical circles of that metropolis to take the business of providing wet-nurses out of the hands of professional agents, and turn it over to a municipal or state institution. There every nurse and her baby would be subjected to a serological test before being permitted to suckle another child. A series of cases seen recently in one of the largest children's clinics in Vienna shows the imminence of the danger. In one case a wet-nurse infected a whole family.

The Wassermann reaction has led to a very radical change of views concerning the curability of lues, and in this relation is of eminent importance in regard to the question when a syphilitic can be permitted to marry. In a very interesting article, in which Pust considers all the various relations which the seroreaction bears to the work of the gynecologist, he expresses himself on this question as follows: "The permission to marry cannot depend solely upon one negative reaction. It must be considered in relation to clinical manifestations of the disease and the treatment the patient has received. Serological tests must be repeated; and negative tests, obtained for a long period of time, will justify the hope that the infection will not interfere with the process of generation."

The elimination of Colles's and Profeta's laws forces us completely to recast the routine rules concerning the breast feeding of luetic children, and of the apparently healthy children of luetic mothers. This question has been instructively discussed by Wechselmann and Pust.

It is important to apply the serum test both to mother and child in all suspicious cases. Especially in the new-born, skin lesions of an indistinct character will necessitate the test for a positive diagnosis. In the cases of syphilitic mothers the serum test of the child will at once, or possibly only after repeated examinations, show whether the apparently healthy infant actually is healthy or in a latent state of the infection. If the test is positive, both in mother and child, the child can be put to the breast of the mother. If the child shows manifestations of hereditary syphilis it can be nursed by the apparently healthy mother, who must be considered infected. If the child's reaction is negative in the absence of luetic symptoms, it should not be nursed by its syphilitic mother. The child of an infected mother should never be placed to the breast of another healthy woman, even if the child's reaction is negative. It is an established fact that symptomless latent syphilitic children, in whom the reaction at first may be negative, may infect wet-nurses. The congenitally infected child often develops the positive Wassermann only later in life. Those who still believe in the possibility of a direct infection of the fetus warn against the nursing of a positive reacting child by a negatively reacting mother, and think it safer to resort to artificial feeding in all doubtful cases.

The last point to be considered is the effect of our new knowledge gained by means of serological studies upon the therapy of syphilitic mothers and their children. It has become obvious that the mothers of luetic children, even if free from all syphilitic manifestations, must be subjected to a vigorous antisyphilitic treatment, since, presumably, they all are infected. The apparently healthy children of all syphilitic mothers must be examined repeatedly and should be treated whenever the seroreaction is found positive.

POSTOPERATIVE PSYCHOSES.

SCHULTZE (*Deutsche Zeitschrift für Chirurgie*, Bd. 104, Heften 5-6) reports twelve cases of mental aberration following operations, and concludes that postoperative psychoses occur after all kinds of operations, but are chiefly to be expected in those patients who have a predisposition to insanity. In a large number of cases a hereditary taint is discoverable. True insanity, in contradistinction to postoperative delirium resulting from operation, occurs in only a small number of cases. In the majority of the cases there was present

fever, intoxication, inanition, and weakness, conditions which offered an explanation for the psychosis. The dependence of the abnormal mental state upon intoxication and infection is shown by two of the author's cases, in which there was complete mental restoration upon discovery and removal of the source of infection. In carrying out treatment, if there is no suppuration, infection, intoxication, or cachexia to account for the insanity, careful attention must be given to watching, nursing, and strengthening of the circulation. The prognosis is, as a rule, not unfavorable, even when carelessness on the part of nurses in guarding the patients is taken into consideration.

REVIEWS.

MEDICAL EDUCATION IN THE UNITED STATES AND CANADA. A Report of the Carnegie Foundation for the Advancement of Teaching. By Abraham Flexner. With an Introduction by Henry S. Pritchett. Bulletin No. 4, New York.

There is probably no line of human endeavor which cannot be bettered by careful and thorough investigation, particularly if this investigation is carried out by those who have a purely academic interest in the questions involved. Investigation often leads to reform and like reform often leads to some erroneous conclusions, which, however, are more than counterbalanced as a rule by the benefits which accrue. It is also a well-known characteristic of the human mind to consider that that pursuit in life which one is himself following does not need investigation, which perhaps accounts for the fact that many Carnegie dollars are being spent in the investigation of medical education, and, so far as we know, are not being dissipated for the purposes of determining the rights and wrongs of the steel industry.

So much has been said in the daily papers concerning this Report of the Carnegie Foundation that its objects are doubtless familiar to many of our readers. Without question this is the most exhaustive report that has ever been made upon medical education in this country and possibly in any other country; and while it is tinctured somewhat with the spirit of the Crusader, it nevertheless contains an immense amount of valuable information, and its general effect without doubt will be distinctly advantageous. The opening chapters deal with matters historical and general with the proper basis of medical education. In the second chapter, however, we note that much emphasis is laid upon the fact that certain men occupying high teaching positions are responsible for the publication of a number of quiz-compends or other short roads to learning which the Report sees fit to condemn. While this is, in one sense, a true statement of fact—that is, as to the responsibility of the authors for the compilation of these books—it is only proper to point out that in almost every instance these books were prepared many years before the authors reached any degree of professional eminence, and at a time when they were teaching in an elementary fashion as quiz-masters. They have not prepared these manuals as indicative of their opinion of what text-books should be provided for the undergraduate.

In the third chapter we find amongst other things a consideration of the requirements which should be enforced concerning the preliminary education of students who are about to undertake medical study, with an indorsement of the view that a knowledge of French and German is essential. We are in hearty accord with the idea that a man should be adequately prepared for the study of medicine, but we have always held that the requirement that a physician have a reading knowledge of French and German is a mistake, because it is not essential for the qualification of a competent practitioner that he should have this type of learning. All knowledge is advantageous, and any form of mental training which

a man may have is beneficial, but as there are only a certain number of years for student work, we think it may be safely asserted that there are many other subjects which will train the mind equally well, and which will be of more assistance to the medical man than modern languages; the more so as the medical literature of the day provides the physician with information in English as to the progress of medicine in all foreign countries. Then, too, it not infrequently happens in this country, because of its cosmopolitan population, that men who are descended from German, Italian, Russian, or French immigrants have more than a reading knowledge of one or two modern languages, but this knowledge has not been gained by study, and in no way indicates that the man has a trained mind. In other words, the requirement as a gauge of training is in many instances fictitious.

Under the discussion of those branches of medicine which are taught in the laboratory, the statement is made that those schools which live on their fees do not present adequate laboratory facilities, and the specific statement is made that the strongest of these schools, the Jefferson Medical College and Northwestern University, can at best develop highly a department or two, the rest being necessarily restricted. In the case of the Jefferson College this is entirely untrue, every laboratory connected with this institution being equally well cared for and developed to the extent that is best for the equipment of the medical student. We do not know whether similar conditions exist in other schools of this class, but it is so in this particular instance, and furthermore, as much of the teaching at the Jefferson College is done in its hospital, which is an endowed institution, the statement as to the teaching being entirely dependent upon the receipts from fees is erroneous. Perhaps another part of the Report was written at a comparatively early date, but the statement that the Jefferson College must accumulate a fund to retire a large mortgage is incorrect, the mortgage having been retired some time since, leaving free these funds for additional teaching facilities.

The chapter which is devoted to a consideration of State Boards of Medical Examiners contains much that is most commendable. The difference in the requirements of these boards at the present time, the questions which are asked in their examinations, and the methods by which the examinations are held, require in many instances much correction. The establishment of some uniform and proper standard of examination is most desirable.

As an illustration of the futility of classifying schools upon the results of a fleeting inspection or upon a basis of their annual catalogue is seen in the recent publication of a list of so-called high-standard colleges in the United States. In this list are to be found a number of institutions almost unknown which certainly do not require of their students the conditions named in their circulars, the teaching staff of which is almost unknown to the profession in general, and the equipment of which is without doubt imperfect. In some instances these so-called "high-standard colleges" are situated in such small cities that ample clinical facilities are quite impossible. In one, for example, the total annual budget is less than $13,000, the receipts from students less than $10,000, and the amount of money available for the instruction of each student is less than $100. Another "high-standard" institution is situated in a town of about 1000 inhabitants. It has less than 10 students and its total annual income from fees is less than $700!

What the medical profession demands, and what the public requires, to-day is the preparation of men well qualified to practice bedside medicine and surgery, who know enough to be safe practitioners, who have enough ambition to keep themselves up with the advances in modern medicine, and who are so well trained that they will make no more mistakes than human fallibility permits. Publications of this or any other kind which serve to increase interest and call attention to existing faults are to be cordially welcomed.

MODERN MEDICINE. Its Theory and Practice. In Original Contributions by American and Foreign Authors. Edited by William Osler, M.D., Assisted by Thomas McCrae, M.D. Volume VII, Diseases of the Nervous System. Illustrated. Lea & Febiger, Philadelphia and New York, 1910.

The seventh volume of Modern Medicine is devoted to Diseases of the Central Nervous System, exclusive of mental diseases, and embraces twenty-one chapters. The volume opens with an "Introduction to Diseases of the Nervous System" containing an exceptional amount of valuable information splendidly condensed, by L. F. Barker. This is followed by "Diseases of the Motor Tracts," by W. G. Spiller; "Combined System Diseases of the Spinal Cord," by C. K. Russel; "Scleroses of the Brain and Diseases of the Meninges," by E. Bramwell; "Diffuse and Focal Diseases of the Spinal Cord," by E. F. Buzzard; "Topical Diagnosis of Diseases of the Brain" and also "Aphasia," by J. Collins; "Diseases of the Cerebral Vessels," by H. M. Thomas; "Tumors of the Brain and Meninges" and also "Hydrocephalus," by H. Cushing; "Diseases of the Peripheral Nerves," by G. M. Holmes; "Diseases of the Cerebral Nerves," by E. W. Taylor; "Paralysis Agitans, Chorea, Choreiform Affections, Infantile Convulsions," by D. J. McCarthy; "Acute Encephalitis and Brain Abscess," by E. E. Southard; "Epilepsy," by W. P. Spratling; "Syphilis and Parasyphilitic Diseases of the Central Nervous System" (Chapter XVII) and "Amaurotic Family Idiocy (Tay-Sachs' Disease)" (Chapter XXI), by B. Sachs; "Neurasthenia, Traumatic Neuroses and Psychoses," by C. W. Burr; "Migraine, Neuralgia, Professional Spasms, Occupation Neuroses, Tetany, Hysteria," by S. E. Jelliffe.

The personnel of the contributors, as just given, their well-established positions in neurology and entire familiarity with the subjects assigned them, attest the discriminating judgment of the editors. As a rule the articles are well balanced, neither redundant nor cramped, and this uniform quality of the contributions constitutes a conspicuous feature of the volume not invariably present in similar works. The subject of Pellagra appears to be an exception; this disease is inadequately presented, its importance certainly meriting more comprehensive consideration than is given in the brief note on page 245, Vol. I, and pages 139 and 140 of the present volume.

The matter is up-to-date and the obsolete avoided without sacrifice of the essential. The work of Flexner and his confrères on Acute Poliomyelitis is in part incorporated in the volume, and in the chapters on Syphilis of the Central Nervous System the Wassermann reaction is given due importance in its application to diagnosis, prognosis, and therapy. That the authors have been in touch with advances immediately applicable to their subject is shown by their familiarity with Ehrlich's work on arsenic preparations in the treatment of syphilis, although evidently dioxydiamidoarsenobenzol has assumed its present absorbing interest since the manuscript left the hands of the authors.

The volume contains thirty-seven plates, a number of which are in colors, and a few illustrations incorporated in the text; all are well selected and uncommonly good. It closes with a general index embracing 53 pages.

The seven volumes of Modern Medicine embrace over 6200 pages, which in the estimation of the reviewer contain an unusually satisfactory, indeed highly commendable, consideration of the science and art of medicine. The prefatory claim of the first volume that "the full resources of the modern world have been brought to bear upon this work" is justified. The publication, completed in approximately three years, results in as uniform modernity as could with reason or justice be expected. The articles throughout are full, often encyclopedic in character, the space distribution judicious, and the editorial selection and supervision have evidently left little to be desired. The work is especially commended to the practitioner who seeks an adequate exposition of the subjects treated and who does not desire the more exhaustive volumes of individual specialists, or special systems, wherein elaboration is sometimes carried to unessential detail.

W. M. L. C.

MANUAL OF HUMAN EMBRYOLOGY. Edited by Franz Keibel and F. P. Mall. In two volumes. Volume I, 548 pages, with 423 illustrations. J. B. Lippincott Company, 1910.

Under the able editorship of Professors Keibel and Mall a number of German and American embryologists have collaborated in the production of a very complete treatise setting forth the present state of knowledge regarding the developmental history of the human embryo. The work appears simultaneously in Germany and America, the German chapters having been translated by Professor McMurrich. Professor Keibel's introduction reviews the history of embryology as a science. The same writer, in the first three chapters, reviews the germ-cells, fertilization, and segmentation. Inasmuch as very little is known about such early stages in human embryology, these chapters appear disappointingly brief, and thereby indicate the gaps in our present knowledge. In the fourth chapter Professor Keibel gives a critical account of the youngest known human ova. The important Teacher-Bryce ovum has served to show that hitherto described ova were really older than was supposed. The fifth chapter on the formation of the germ-layers and the gastrulation problem is a historical résumé of the arguments for and against the older conceptions. If a few diagrams of the formation of the notochord, of the notochordal canal, neurenteric canal, and of the mesoderm had been included, this chapter might have been cast in briefer form and set forth, more clearly than it does, the new conception of the "two-phase gastrulation" in vertebrates as propounded by Keibel and Hubrecht in 1888-9.

The development of the human embryo and the differentiation of its external form are considered in Chapter VI. This is admirably illustrated by a large number of selected embryos in different stages and includes a résumé of the proportions of the human body during the fetal period. A very complete chapter from the pen of Professor Grosser discusses the development of the egg-membranes, the placenta and menstruation, and a good bibliography is appended.

The eighth chapter is on the determination of the age of human embryos and fetuses, based on extensive investigations and containing many significant facts concerning the duration of pregnancy. An analysis of extant data affords a means of correcting former notions, as, for instance, that Peters's ovum was three days old; as Mall says, "fifteen is much more nearly its correct age." A common source of error lay in the fact that a menstruation may occur in a woman after becoming pregnant.

About 50 per cent of the ova aborted in the first two months of pregnancy are shown to be pathological, and these forms are considered in Chapter IX by Professor Mall.

The remaining chapters concern the development of the integument (by Pinkus), the connective tissues, the morphogenesis of the skeletal system (by Bardeen), the development of the muscles (by W. H. Lewis) and of the cœlom and diaphragm (by Mall). The presswork is excellent throughout and typographical errors are few in number. The second volume is to appear at an early date. E. A. S.

APPLIED ANATOMY. By Gwilym G. Davis, M.D. 630 pages with 630 illustrations, many in colors. J. B. Lippincott Co., 1910.

A perusal of this book soon convinces that the author's aim to consider the construction of the human body in relation to its functions, diseases, and injuries has been successfully achieved. The regions of the body are taken up in order from head to foot, giving a plain account of the regional anatomy of each part. These accounts are brief, since they are only intended to refresh the reader's memory of the more detailed systematic anatomy. The author is therefore enabled to indulge more fully in interpretation, in the "why and wherefore" of anatomic relations and structure—in other words, things as they are reasoned out. Attention is then given to the surface anatomy, and this is followed by a consideration of the affections of the part. The book is well written, and although the author disavows completeness few additions

could be suggested, such as the applications of the *x*-ray. The directions for operations are clear, concise, and up-to-date. Here and there a few notes on the morphology of certain parts (shoulder-girdle; development of the urino-genital system) throw interesting side-lights and enliven the text.

The work is remarkably free from typographical errors. The illustrations are largely original, from the dissections made by the author and by Dr. A. P. C. Ashhurst, the drawings being from the pen and brush of Messrs. E. F. and Herman Faber. Twenty-five figures at the end of the book are drawn from frozen sections of the body, and materially assist in the orientation of parts. The book is dedicated to Professor Piersol, and is a worthy contribution on the subject. The presswork is excellent. E. A. S.

LIPPINCOTT'S NEW MEDICAL DICTIONARY. A Vocabulary of Terms used in Medicine and the Allied Sciences, With Their Pronunciations, Etymology, and Signification. By Henry W. Cattell, A.M., M.D. Freely Illustrated. The J. B. Lippincott Co., Philadelphia, 1910.

We have two faults to find with the title-page of this book: one is the giving of the publishers' name to the dictionary, whereby the author is deprived of the credit which is his due. The scholarship and the labor belong to the author; the printing of the book and its selling are the publishers'. The second fault is a fact of minor importance, namely, that the type on the title-page does not all belong to the same font.

The present volume is based upon the medical dictionary published some years ago by the same firm which was compiled by the late Dr. John Ashhurst, Dr. George Piersol, and Dr. Joseph P. Remington. Neither of the surviving editors of the earlier publication has taken an active part in the compilation of this one.

The book appears in flexible leather binding and covers about 1100 pages. An innovation is the introduction into its pages of the pictures of well-known medical men, for example, Pasteur, Dupuytren, and Dr. Welch, of Baltimore. We are glad to note that the definitions are more correct than the pictures, but why Welch's picture should be put side by side with the *Bacillus Welchi*, and Weir Mitchell's picture should not be side by side with "Weir Mitchell Disease" we fail to comprehend. The picture of William Harvey is certainly remarkable. The illustrations are all of them in black and white, and like most illustrations in dictionaries are necessarily limited in size. Turning, however, to the work of the author, we find that it has been carefully performed, is adequate in scope, and that the definitions have been brought well up to date. The book, therefore, may be considered as a worthy companion to the other medical dictionaries published within the last few years by eminent American medical men.

THE WORKING PEOPLE: THEIR HEALTH, AND HOW TO PROTECT IT. By M. G. Overlock, M.D. The Blanchard Press, Worcester, Mass., 1910.

This volume is not intended as a text-book for medical men, as is evident from its title, but nevertheless most medical men can read it with advantage, and it will help them deal with a very large proportion of their patients in an intelligent manner. One of the reasons why drugs are often given, when the patient would do as well without them, is that it appears from the circumstances of the patient that treatment by drugs is the only course which is open, and so the physician often fails to inquire with sufficient care into what the patient can do for his health when he directs him as to what he ought to do. As Cabot has well pointed out, it is futile to give advice which is practically impossible.

Not only can the physician read this volume with advantage to himself, but he can also place it in the hands of his well-to-do patients in order that they may be stimulated to charitable deeds, and, in addition, endeavor to do good in a way which will produce practical results. Finally, it can be placed in the hands of the man of very moderate means as a guide which will help him over many difficult places. Indeed, the author tells us that he has prepared it in a plain way for plain people, or, in other

words, for the great mass of men and women who make up the bone and sinew of the nation.

The book contains fifty-two chapters which are written clearly and in language easily understood by the average non-professional man. The early chapters (eleven of them) deal with problems which are closely associated with, or actually concerned in, the prevention and combating of tuberculosis. Subsequent chapters deal with the dangers of overwork, the conservatism of the patient's strength and of the nation's health, and with various economical problems, as, for example, the question as to pregnant women working in factories, the necessity of adequate ventilation in factories, and the subjects of spendthrifts and lack of economy. There are also chapters upon appendicitis, disorders of digestion, rheumatism, school hygiene, nervousness, and most of the acute infectious diseases like diphtheria and scarlet fever. Naturally, one of the most important chapters is that upon what to eat and how to eat it, and still another of great importance is that of hydrotherapy in its relation to health. It is manifest, therefore, that a very large field is covered by the author, and we may add that it is covered very well. In a considerable number of instances interesting and valuable facts are given concerning death-rates and epidemics.

We commend this book particularly to employers of large numbers of men and women, who both from the standpoint of good business and humanitarianism have every wish that their employees should at once be capable and possessed of the wealth of health.

SOME COMMON REMEDIES AND THEIR USE IN PRACTICE. By Eustace Smith, M.D. Paul Hoeber, New York, 1910. Price $1.25.

This little book of a little more than 100 pages, including its index, consists in reprints of papers contributed to the *British Medical Journal* at intervals during the years 1908 and 1909. Eustace Smith has been known to at least two generations of American medical men as an active and skilful clinician. He still advocates many remedies which some younger practitioners have cast aside, notably antimony; but this little brochure is of value in that it embraces the results of his wide experience, and in addition is a protest against some of the therapeutic nihilism which to-day is rampant. Perhaps the most important thing that it teaches is that drugs may be beneficial, or the reverse, according to the judgment and knowledge with which they are prescribed. The table of contents shows the field which is covered:

I. On an Unjustly Neglected Remedy—Tartarated Antimony (Tartar Emetic).

II. On the Internal Use of the Oil of Turpentine.

III. On the Use and Misuse of Iron Remedies.

IV. On the Use of Alkalies in Practical Medicine.

V. On Antispasmodics and the Cure of Spasm.

VI. On Some Uses of Opium.

VII. On the Use of Sodium Salicylate in Certain Serous Inflammations.

AN INTERNATIONAL SYSTEM OF OPHTHALMIC PRACTICE. Edited by Walter L. Pyle, A.M., M.D. Illustrated. P. Blakiston's Son & Co., Philadelphia, 1910. Price $4.00, net.

It is evidently the intention of the editors and publishers to bring out this International System of Ophthalmic Practice in seven volumes, and this, apparently the first volume, although it is not so numbered, deals with ophthalmic therapeutics. It is written by Dr. A. Darier, of Paris, the text being translated by Mr. Sydney Stephenson, of London. The book contains less than 400 pages of large type and is easy and excellent reading. Because of its contents this volume will prove of more interest to the general practitioner than any of the other volumes which will deal with medical ophthalmology, ophthalmic diagnosis, the pathology and bacteriology of the eye, diseases of the orbit and accessory cavities, refraction and eye-strain, and ophthalmic surgery. We have no doubt that ophthalmic surgeons in general will frequently refer to the text of the present

volume in order to get accurate and complete information in regard to many remedies which are used locally, injected subcutaneously, or given by the mouth in various conditions of the eye. Not infrequently prescriptions are given to illustrate how these remedies had best be employed. This book is one of the few upon diseases of the eye which will prove of constant value to the general practitioner who does not consider himself an ophthalmic surgeon in any sense of the word.

PROGRESSIVE MEDICINE. A Quarterly Digest of Advances, Improvements, and Discoveries in the Medical and Surgical Sciences. Edited by H. A. Hare, M.D., Assisted by L. F. Appleman, M.D. September 1, 1910.

Progressive Medicine has now been before the profession for more than twelve years, and has apparently attained the position it sought, namely, of being a competent and useful summary of medical and surgical progress during the preceding twelve months. As in previous years the September issue deals with diseases of the thorax and its viscera, by Dr. William Ewart, of London; Dermatology and Syphilis, by Dr. William S. Gottheil, of New York; Obstetrics, by E. P. Davis, of Philadelphia; and Diseases of the Nervous System, by Dr. William G. Spiller, of Philadelphia. Illustrations are used whenever it is necessary to render the text more useful to the actively engaged practitioner.

LECTURES ON COSMETIC TREATMENT. By Dr. Edmund Saalfeld. Translated by J. F. Halls Dally, M.A., M.D., M.R.C.P. With Introductory Notes by P. S. Abraham, A.M., M.D. Paul Hoeber, New York, 1910. Price $1.75.

We believe that this small book of less than 200 pages will prove very useful indeed to many general practitioners. It has its origin in a series of papers published in the *Therapeutische Monatshefte* in 1892, on the subject of Cosmetics, and deals not only with the application of various salves and ointments for the improvement of the skin, but also with the treatment of various conditions of the skin which are in the nature of blemishes or of perverted function, as excessive sweating. In other words, it helps the general practitioner to meet many conditions which are not important as to life, but are important as to the mental comfort of the patient, and enables him to meet the needs of many persons who are desirous of being relieved of conditions which cause them annoyance.

MEDICAL JURISPRUDENCE AND TREATMENT OF POISONING. By R. C. Ray. Published by the Author. Calcutta, 1910. Price 2 rupees.

We are told in the preface that these pages contain in easy English and methodically arranged all that a medical undergraduate or a medical jurist requires in an out-of-the-way station, where he has not more pretentious books, and where he can carry a "tabloid of jurisprudence." The text is, of course, adapted to East Indian practice, and gives a summary of East Indian laws in regard to certain crimes. It also gives information in regard to the symptoms and pathological changes produced by many poisons, and also states the antidotes which should be employed when these poisons are swallowed. We have no doubt that it will prove useful in India, and to those who are interested in this topic it will be of interest as indicating the difference between medicolegal matters in the Far East and in this country.

PRACTICAL OBSTETRICS. By E. Hastings Tweedy, F.R.C.P.I., Master of the Rotunda Hospital, and G. T. Wrench, M.D., Late Assistant Master. Second Edition. London and New York, Oxford University Press, 1910. Price $5.50.

This practical book should prove a valuable addition to the literature of the subject and a useful guide to the overburdened medical student and the young practitioner without personal experience. It will be more widely used in Great Britain than in this country, but should prove an acceptable addition to a small working library on the subject for our undergraduate students. The language is terse and clear; the teaching is dogmatic, all controversial matter is avoided, and, needless to say, the views expressed are based on a large experience. Some of the procedures advocated strike

one as a little crude and adapted to a poor class of practice, but after all this is the kind of practice in which the majority of physicians are engaged, and the principles of asepsis, for example, are thoroughly sound. B. C. H.

DISLOCATIONS AND JOINT FRACTURES. By Frederick J. Cotton, A.M., M.D. Illustrated. W. B. Saunders Co., Philadelphia and London, 1910.

Cotton aptly expresses the feeling that has actuated him in the preparation of this work when he says that "no man can do more in book-making than to present with pen and brush what he knows from instructive reading and personal observation in as direct a way as he can." Very properly the results of personal observation dominate the work. Moreover, the illustrations are singularly apt.

In regard to the *x*-rays the author notes that owing to them the profession has learned the frequency with which joint fractures are found as complications of apparently typical dislocations, and that the elbow fractures of children should be looked on as epiphyseal fractures, not at all corresponding with the T-fractures and fractures of the internal condyle which occur in adults. The lesions of the lower humeral extremity in children are supracondylar fractures, the separation of the whole epiphyseal end of the bone, separation of the epiphysis of the external condyle forming a distinct outer half of the whole epiphyseal end, and separation of the little epiphysis of the internal condyle.

Cotton states that very commonly a skiagram as a preliminary to treatment of fractures is unnecessary and is often impracticable, and that in the great majority of cases a properly trained surgeon can make his diagnosis, as far as practical details go, about as well without the *x*-ray.

In regard to non-union, the author states he has seen no case cured by operation which would not have united in time, save in a few instances of interposition of muscle or tendon.

As to operative procedure for non-union attention is called to the fact that tendons and capsules may be cut and sutured without damage, but that muscles cannot. The simplest means of fixation is advised; a strand of kangaroo tendon is usually enough.

As to the treatment of compound fractures in which the bone has apparently pierced the skin and then rebounded, it is held that these wounds should be opened and cleaned. As to gas bacillus infection, Cotton observes that early recognition and adequate treatment will give a relatively small mortality.

In the diagnosis of fat embolism Dennis's rule is quoted: "Shock three hours, fat embolism three days, pulmonary embolism three weeks."

In the diagnosis of lesions of the first two cervical vertebræ it is noted that substantially all of these injuries show forward displacement if any. Flexion in fractures in this region sometimes shows no deformity. There is no locking, but simply a slumping. The head seems to lie loose. The treatment is by immediate reduction. The section upon vertebral injuries is one of peculiar interest and value.

For dislocation of the outer end of the clavicle with injury of both fasciculi of the coracoclavicular ligaments operation is advised. Indeed, all these injuries are best treated by open methods. The discussion of shoulder luxation is along the usual lines, with variations incident to personal experience. It is noted that injuries to the elbow in adults as a rule result from severe accidents, while in children the fall that gives such injuries may often enough be very slight. Whilst the luxations of the two ages are identical, the fractures are very unlike. In the treatment of supracondylar fracture, Cotton advises replacement under ether. The tendency is to let the forearm drop or roll too far inward. After reduction the upper arm should be tightly gripped near the elbow in both hands with some force so as to fix the fragments while the assistant partly extends the arm. This will show whether the long axis of the arm has been restored. The splint to be used is the internal angular, preferably Bolles's, which is

set close in the bend of the elbow and strapped with adhesive to the upper arm; whilst some traction is exerted on the forearm to overcome possible backward displacement while the final straps are applied. As to treatment by acute flexion, whilst it works well in some cases, in others it tends to produce forward rotation.

Cotton has contributed a very valuable study of Colles's fracture and its variants and urges that all cases be treated under an anesthetic if possible.

As to the treatment of displaced semilunar cartilage, Cotton believes that operation will give prompter and more certain results in chronic cases than any means of treatment. He asserts that the loss of the cartilage in no way interferes with the perfect function of the joint, nor is the long axis of the leg perceptibly changed.

Fracture of the patella without separation of fragments, whether it be due to direct trauma or to cross-breaking strain, will do well under any treatment or under no treatment; fractures with separation under conservative treatment never unite by bone.

With some of the teachings of this book many surgeons of large experience will not agree. When it is realized that the author's enunciations are based not merely on his personal experience but upon a wide knowledge of the views of others, and that his conclusions are logically deduced from proven premises, even those who are not in accord with his views will read them with respect, will give them careful thought, and certainly, in some cases, will subject them to the clinical test. This book will be appreciated in direct proportion to the knowledge and experience of the reader.

CORRESPONDENCE.

LONDON LETTER.

BY J. CHARLTON BRISCOE, M.D.

The beginning of October always brings a busy time to the medical schools and hospitals of London. Most of the schools reopened during the first week of the month, and in many cases the opening day of the session was the occasion for an address of welcome to the newly joined students. Perhaps the most interesting of these addresses, both from a general and medical point of view, was that delivered by Lord Kitchener at the Middlesex Hospital, in which he prophesied the speedy banishment from the army of enteric fever, a scourge more deadly than the bullets of the enemy. He pointed out that a vast field for research remained in the fight against malaria, which still to a great extent baffles the efforts of army surgeons. Measures that had been successful in Khartoum in stamping out the disease are not possible in India, where the susceptibilities of a vast native population have to be considered, and where sanitation and water-supply are not under adequate control. His lordship regretted to think that England lagged behind other nations in the struggle for the prevention of diseases by means of improved treatment and sanitation, and alluded to the success that America has achieved in so apparently hopeless an area as the Isthmus of Panama. Lord Kitchener concluded by urging all those students who intended to enter the Royal Army Medical Corps to acquire a thorough knowledge of the routine and organization of the army, and also that they should endeavor to obtain practical experience of the treatment of patients in the field.

Some of the social problems discussed by the British Association last month at Sheffield were again brought forward at the annual Church Congress recently held at Cambridge. Several speakers vigorously advocated the restraint of marriages among the "unfit," and even a bishop lent his countenance to the revolutionary proposal. One

speaker declared that the evil of the production of feeble-minded children could be diminished by discouraging imprudent marriages and by the segregation of those palpably unfitted for marriage in industrial colonies apart from the ordinary community.

Mrs. Pinsent, of Birmingham, in a very striking speech pointed out that this perpetuation of the unfit is an indirect effect of our legislative efforts, and that the better class of citizens are being heavily taxed to provide training and ultimate support for degenerate families. As a result good citizens are led to limit the number of their children, to the detriment of the nation. She supported the idea of the segregation of the unfit, and said that the more efficient members of society should be encouraged to have larger families, and State encouragement should be given to the reproduction of better stocks. The Bishop of Ripon declared that the decline in the birth-rate among the better classes was due more to the greater desire for luxury than to the greater stress of life. Human nature being what it is, it would appear that these persuasive measures will be of little avail in the solution of this knotty problem, unless supported by legislation which will permit actual segregation of the palpably "unfit."

A lively discussion on the "Americans at Oxford" is now being carried on in a well-known newspaper. The discussion was started by a letter from an Oxford man, in which he implied that the spirit of Mr. Rhodes's great bequest was not being complied with by those who have been fortunate enough to secure the scholarships. The writer of the letter thought that the American scholars were taking from Oxford everything that she had to give, but withholding from her anything that they might have in their power to give in return. The idea underlying the bequest was that the American scholar should become one of the Oxford undergraduates, should join in their social life, and live as their friend and brother during the three years of university life. It is said that the foundation of the American Club at Oxford has destroyed the possibility of these objects being fulfilled, as the Rhodes scholar until the time of his departure makes friends only with his compatriots. The other side of the picture was presented next day in another letter from a man who knew Americans well, and further knew these particular Rhodes scholars. Knowing them well, he had found it difficult to believe that the fault lay entirely on their side. He contended that the Americans arrived in Oxford with a real desire to reach intimacy with their English fellow students, but found themselves baffled by English "formality" and "emotional repression." English undergraduates contend that they have endeavored to make the Americans feel at home and as of themselves, but complain that their advances are not met in a responsive spirit. It is obvious that with so much good-will on either side a solution must be found to the problem, though the differences in training and surroundings must always make the situation rather a difficult one. Many of the scholars go back to their own country with a deep love for Oxford in their hearts, and these are the men whom Oxford delights to honor; only last year an American was elected president of the University Athletic Club. It would appear that it is the men of lesser caliber who are not capable of making a place for themselves in any university who find Oxford cold and unresponsive; these men naturally consort together, and neither obtain nor impart much benefit from their three years' course. They form, however, but a small proportion of the whole, and there is evidence that in spite of failure and misunderstanding the fundamental purpose of Mr. Rhodes does move slowly toward its fulfilment.